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The Glasgow :: Naturalist

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(Including the *Transactions* and *Proceedings* of the Society, Third Series).

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EDITED BY

D. A. BOYD AND JOHN PATERSON.

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CONTENTS.

PROCEEDINGS—*Continued.* PAGE

Photo. H. W. WILSON.

CORMORANTS' NESTS AT CASTLE LOCH, MOCHRUM.

Photo. H. W. WILSON.

CORMORANTS LEAVING THEIR NESTS, CASTLE LOCH, MOCHRUM.

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Vol. IV., No. 1.] [November, 1911.

A visit to Castle Loch, Mochrum.

By R. W. S. and H. W. WILSON.

[Read 31st October, 1911.]

CASTLE Loch lies in a moorland district in the Parish of Mochrum and County of Wigtown. Extending to 287 acres, it is one of the largest of a group of lochs lying within two miles of Luce Bay to which it is connected by the Craignarget Burn. It has an average depth of ten feet, and, unlike the neighbouring loch of Mochrum, its waters have a peculiar muddy appearance, which is constant. On an island at the north-east corner stands the ruins of an old castle, from which the loch no doubt takes its name, and the remaining islets are, for the most part, mere rocks, showing but a few feet above the water. To the visitor from Glasgow it is easy of access by way of Dunragit and Kirkcowan, and can be done in one day. The district is a rich one for birds, which are carefully protected, without distinction of species, by order of the proprietor, the Marquis of Bute. The object of our visit was to study the Cormorant (*Phalacrocorax carbo*) in its summer quarters, and, if possible, to obtain photographs of its domestic economy. For either purpose it would be difficult to conceive a more ideal place.

The distribution of this species and its near relative, the Shag (*Phalacrocorax graculus*), in the Clyde Area, presents some interesting features.

The Cormorant is a familiar species throughout the year, but no satisfactory information exists of it ever having nested in the

Clyde Area, although reputed to do so on the south Ayrshire coast and on Ailsa Craig. In May, at the height of its breeding season, flocks up to thirty birds in number may often be seen on certain rocks on the shores of the Little Cumbrae, and near the Garroch Head, in Bute. These flocks consist, probably, of non-breeding birds.

Inland, it occurs frequently on fresh-water lochs and reservoirs, generally solitary, and is a regular visitor to Loch Lomond. It has occurred on Balgray Dam, the nearest place to Glasgow in which we have observed this bird.

The Shag, on the other hand, although less frequently seen, at least on the upper waters of the firth, nests regularly in two localities in the Clyde Area.

The Cormorant at one time bred annually on an island in Loch Moan, just on the southern borders of the Clyde area, and the following extract from Robert Gray's *Birds of the West of Scotland*, page 454, well describes the cause of their deserting that locality :—"In the breeding season of 1867, this loch was visited by a fishing party who, finding nothing in the loch itself—every fish having been devoured by the birds—launched a boat they had brought across the hills and proceeded to the island, where they built a pyramid of Cormorants' eggs, which they had no difficulty in gathering, to a height of two or three feet, and smashed the entire lot with heavy stones. One of the party—an officer in the 33rd Regiment—informed me that though the eggs were not counted, he was certain of more than a thousand having been destroyed." Few birds if any, have nested there since. On a visit to Loch Moan in May of the present year we found the Cormorant's Island to be occupied by a flourishing colony of the Black-headed Gull (*Larus ridibundus*), and although an occasional Cormorant may be seen in the neighbourhood, as a breeding species it is now unknown. The following notes refer to a short visit paid to Castle Loch on 25th May, 1911, by the writers in company with Mr. T. W. Wilson.

Leaving Glasgow with the early morning train, we arrived at Kirkcowan about eleven o'clock, and set out on our walk to Mochrum. For the first two miles the road runs through a level tract of pastoral country, merging then into flat heather-clad moorland at a slightly higher elevation, and proved rather

uninteresting to us; the Kirkcudbright hills standing clear and distinct away to the north-eastward only helped to show, by contrast, the flatness of the surrounding country.

The Common Bunting (*Emberiza miliaria*) was the most interesting bird seen on this part of the journey, and many were heard in song.

All the way the Black-headed Gull had been much in evidence, and when Loch Wayoch, which lies some four miles from Kirkcowan, was reached, we found a flourishing colony of these birds. Here as arranged we met Mr. M'Dowall, the game-keeper, under whose guidance we soon reached the home of the Mochrum Scarts, as the Cormorants are called thereabouts.

From an islet close to the boat-house a number of Common Terns (*Sterna fluviatilis*) rose as we approached, and were evidently preparing to nest there. Rowing slowly past within ten feet of the first of the three islands occupied by the Cormorants, the birds presented a fine appearance as they sat on their nests. Many left and settled on the water close by, but this did not make any appreciable difference in the numbers remaining, so closely were they packed.

We landed on the second island at a point farthest away from the bulk of the sitting birds, a goodly number of whom took wing. However, on seating ourselves, they immediately began to return, and soon most of the nests were again occupied. It was a scene of great animation, birds were continually arriving from the shore with bunches of bracken and heather stems which were added to the nests by the sitting birds. Some were diving from the rocks, many were afloat on the dancing water, while others were sitting with wings outspread to dry, or busy preening themselves. They were in fine plumage, and the white on the cheeks and flanks gave them quite a smart appearance.

The green iris was very distinctly seen, and the wing coverts had a peculiar appearance, being more like scales than feathers. The plumage of both sexes appeared to be alike, and no immature birds were seen.

The nests were massive structures built of stout heather stems, and varying from three to eighteen inches in height (Pl. I.). Their well-trimmed sides were whitewashed with the excreta of the birds, as was the surrounding rock, which, contrasting with the deep

brown colour of the bracken lining, helped to show them up to greater effect. They were built in regular rows, with about two feet separating each nest, and were so strongly constructed as to bear the weight of a man. The eggs varied from three to five in number in each set, and from the state of incubation of those we examined, most of the birds had been sitting for about a fortnight. A good number of the birds had not finished laying, while many nests were not yet completed. To ascertain the numbers of eggs laid in a season, Mr. M'Dowall goes round the colony periodically and marks them with an indelible pencil. On 21st May, 1911, *i.e.*, four days prior to our visit, his tally amounted to 900 eggs, while in 1909 the total number marked was 1,467. We reckoned the population to be about 300 pairs, and to support this host of voracious birds must indeed take a "multitude of fishes." There was no evidence of the disagreeable odour which is generally described as inseparable from a nesting colony of Cormorants. Later on when the young appear, and a lot of fish remains would be about, no doubt the colony would differ but little in this respect from others. The keeper informed us that the Cormorants did not fish in these lochs, but went daily to Wigtown and Luce Bays for that purpose. When the young are well grown, the parent birds must be hard pushed to satisfy themselves and their dusky broods.

A feature of this group of lochs is the gulls. We observed two pairs of Great Black-backed Gulls (*Larus marinus*), several Herring (*L. argentatus*), and Lesser Black-backed Gulls (*L. fuscus*), two Common Gulls (*L. canus*), and many Black-headed Gulls (*L. ridibundus*), all of which, Mr. M'Dowall informed us, breed in the immediate vicinity. This leaves the Kittiwake as the only British breeding gull which does not nest there. The Tufted Duck (*Fuligula cristata*) and the Great Crested Grebe (*Podicipes cristatus*) are well known nesting species.

As we left the loch in the late afternoon, many parties of Scarts were coming in from the sea, flying slowly as if tired out with their day's fishing, in the stormy waters of Luce Bay.

We take this opportunity of expressing to Mr. M'Dowall our best thanks for the valuable assistance rendered by him, in enabling us to visit this interesting nesting colony of Cormorants.

Destruction of Timber in the Storm of 5th November, 1911.

By John Paterson.

"Guy Fawkes's Day," 1911, will long remain associated in Scotland with a dreadful storm from the south-west. Seldom in human memory has more destruction been done to timber throughout Scotland. The writer had the devastating effect of the storm brought vividly home to him by his experience at Ardenconnel, Row, Gareloch, where he was staying for the week-end. In this small property of six and a-half acres, chiefly between nine and twelve forenoon, seventeen trees, nearly all well-grown ornamental trees of ages running up to a century, were overturned. Larch, Oak, Deodar Cedar, Holly, and some handsome examples of the Chinese Arbor-vitæ (*Biota orientalis*) were among the victims of the storm. At Skelmorlie, thirty-two trees and shrubs were uprooted in a villa garden of one acre. These included examples of *Picea nobilis* and *P. lasiocarpa* 40-50 feet high. At Blair, Dalry (Ayr), a magnificent Beech which grew near the house, and was well known to many members of our Society, was blown down. Mr. Archd. Shanks informs me it was 75 feet high, the trunk 16 feet 1½ inches in girth at a height of 4½ feet. Our Society has, fortunately, a fine photograph of this tree in its collections. Over fifty trees were uprooted at Blair, six hundred at Eglinton Castle, and a thousand at Culzean Castle, all in Ayrshire. Several of the large Beeches in the Town Avenue, Inveraray, were destroyed. Readers of this Journal will be sorry to learn that the unique Grey Poplars at Mauldslie Castle, a plate of the largest of which was included in our last number, suffered severely, although they were not overturned, and the remarkable old Gean Tree in the park there was another sufferer. At Garrion Tower a Plane Tree (*Platanus orientalis*), the largest of its kind known to us in "Clyde," was destroyed. At Bothwell Castle much destruction was done to the trees and the great Beech Wood, Cadder Wilderness, near the city, was heavily hit. Still nearer home, indeed within the city's bounds, sixteen fine Beeches and Elms were destroyed in Queen's Park and eight Willows and two Thorns at Kelvingrove.

The press, for a few days after the storm, contained many interesting details, the correspondents seldom failing to be picturesque in their descriptions. Five thousand trees were blown down "on the town's lands at the Muir of Auchterarder. The Strathallan and Tullibardine woods have suffered severely. At Blackburn a plantation has almost disappeared" (*Glasgow Herald*, 8th Nov., 1911). At Kippenross a "huge plane tree" (in this case no doubt a Great Maple), was blown on to the railway line. Kippenross was the home of the most celebrated of all Scottish Great Maples—the one of which a plate appears in *Sylva Britannica*. The avenue leading up to Drummond Castle, Crieff, lost five or six of its "stately old trees which have withstood the storms of centuries," and on the extensive estates there thousands of trees were uprooted. At Eastertyre two "giant Beeches" were overturned, while in the woods and forests of Athol and Strathtay, hundreds of trees shared the same fate. At Ballinloan a "magnificent" Larch fell "after withstanding the storms of centuries" (*Scotsman*, 6th Nov., 1911). "A famous view of the ancient Parish Church [of Haddington], the 'Lamp of Lothian' has been entirely altered by two of the old giant Willows, several of which have from time immemorial stood close to the church at the south-east corner, being overthrown side by side" (*loc. cit.*). A quaint touch is supplied regarding the uprooting of a tree "which is supposed to have stood at the same spot for over 100 years"!—this was "Katie Wearie's Tree" at the West Port, Linlithgow. From the *Oban Times* (11th Nov., 1911) we learn that the "beautiful wood which forms such a picturesque background to the Banavie Hotel suffered very severely, hundreds of Larch and Pine trees being levelled to the ground." A similar story of destruction comes from Corpach, while great havoc was done in Dunollie wood and on the Glencruitten estate.

According to the *Dunfermline Press* (11th Nov., 1911) a historic tree was destroyed at Pitreavie. It states that—"In "Dr. Henderson's 'Annals of Dunfermline' mention is made of "the 'hanging tree' which grew in the north wood of Pitreavie "estate. On this tree some of Oliver Cromwell's officers were "alleged to have caused the death by hanging of seventy survivors "of the battle of Pitreavie. The tree was a Beech, and stood on

"the top of a mound in the centre of the north wood. It was a "magnificent specimen, being ten feet in diameter, and the "upheaval of the earth round the roots reached 30 feet in "height."

While attention is drawn above to the most salient of the facts that have come under my notice in connection with the destruction of timber by the great storm in November, it will be understood that, far from exhausting the subject, only a brief summary is possible in the space available.

Waders observed at Balgray Dam, East Renfrew. (Autumn, 1911.)

By JOHN ROBERTSON.

OWING to the deficient rainfall in the three summer months, Balgray Dam was beginning to show margins of mud and sand at the end of July. The shortage in rainfall continued during August and September, and the fall in the level of the water in the dam was constant and unchecked during these two months. The consequence was, that by the third week in August so much of the bottom of the dam was exposed, that it had much the appearance of a part of the sea-shore when the tide is out, and it afforded an attractive feeding ground for passing waders. These passing birds are, in my opinion, making their way from the Forth to the Clyde. This has been much the best season at Balgray since I began to pay attention to it in autumn in 1895. Since that year I have noted twenty-two species of waders by the side of Balgray, and of that number seventeen were observed this autumn.

RINGED PLOVER (*Ægialitis hiaticola*).—The first Ringed Plovers seen this autumn were two birds on 30th July, and the last one (or possibly two) on 25th September. On 26th and 27th August there were at least twenty birds round the margins of the dam. I have often observed the Ringed Plover before in East Renfrewshire, but never in such numbers. Eight was the greatest number on any former occasion. Previous to this year I had personally noted it in East Renfrewshire generally on nineteen

occasions, once in February, five times in May, and thirteen times in July, August, and September. This autumn I have seen it on twelve separate visits to Balgray.

Golden Plover (*Charadrius pluvialis*).—The first noted were about a dozen birds, on 30th July, at the side of Ryat Linn Dam, which adjoins Balgray, where it was present at every visit from 6th August on. It is common here in autumn, sometimes thousands being present.

Lapwing (*Vanellus vulgaris*).—The Lapwing of course was always present, the flocks increasing in size as autumn progressed.

Turnstone (*Strepsilas interpres*).—On 13th August I saw one Turnstone, which was also noted a little later in the day by Messrs. Robert and Hugh Wilson. On 19th August there were at least two birds present. The Turnstone is an addition to the birds of East Renfrewshire.

Common Snipe (*Gallinago cœlestis*).—The Common Snipe was always present, about twenty-five birds being the largest number seen in one day.

Dunlin (*Tringa alpina*).—Another well-known bird at Balgray. It was always present this autumn, about twenty-five birds being the most seen in one day.

Curlew-Sandpiper (*T. subarquata*).—The first I saw this year were three or four birds on 26th August. On 27th August there were six, on 3rd September one, on 24th six in one party and thirteen in another, on 25th at least twenty, and on 30th Mr. Thomas Hill watched a flock of nineteen from the shelter of a wall at a near distance. Previously, three was the largest number I had seen here at one time, and these were always in September and October. I never saw the bird here in August before.

Knot (*T. canutus*).—Mr. Robert Wilson saw a flock of twenty-four Knots on 17th August. These were still present on 19th and 20th, when I had the pleasure of seeing them. Mr. Wilson saw two on 22nd, and there were three on 27th. It was not observed again till 24th September, when about ten were seen. The Knot is another addition to the East Renfrewshire list, and I am not aware of the record of such numbers, or indeed of any, occurring by inland waters in Scotland previously.

Ruff (*Machetes pugnax*).—Mr. Robert Wilson saw one Ruff on 17th August. It was still present on 20th. On 22nd there

were two, on 26th one, on 27th three, on 17th and 25th September one, and on 8th October one. The Ruff is well known in small numbers here in autumn.

Common Sandpiper (*Totanus hypoleucus*).—This species is well known at Balgray in the season. This autumn it was in greatest numbers on 6th August. The last seen were a few on 27th August. They seemed to leave here about a month earlier than usual this year.

Green Sandpiper (*T. ochropus*).—On 6th August, when going round Ryat Linn Dam with Messrs. Robert and Hugh Wilson, we saw a Green Sandpiper, and later the same or another bird at Balgray. On 13th August there were two of these birds present, which were sometimes in company and at other times apart. The known occurrences of the Green Sandpiper in the Clyde area are so few that they may be noted here. One shot and another seen at Nether Pollok, East Renfrewshire, November, 1868; one shot, Dougalston, Milngavie, December, 1894; one seen, Hangingshaw, Glasgow, December, 1904; one seen, Rouken Glen, April, 1905; one shot, Garscadden, Dumbartonshire, December, 1905 (*Trans. Nat. Hist. Soc., Glasgow*, Vol. VIII. (N.S.), pp. 106-107); and one seen on the Medwin, Lanarkshire Peeblesshire, August, 1910 (*Annals Scottish Nat. Hist., 1911*, p. 141). Finally, in the present autumn, one was got at Strathaven (Lanark), and was exhibited before our Society at its November meeting.

Redshank (*T. calidris*).—The Redshank was numerous all the season, being most abundant in the third week of August.

Greenshank (*T. canescens*).—I heard one on 19th August, but it was not noted again till 24th September, when there was one bird present. On 1st October there was one, on 8th two, and on 15th one. This is an annual autumn visitor to Balgray.

Bar-tailed Godwit (*Limosa lapponica*).—On 17th September there was one bird in grey plumage which remained for a week at least. There is only one previous record for East Renfrewshire.

Black-tailed Godwit (*L. belgica*).—Four were seen on 3rd September. These remained till 10th, and on 17th two were still present. For East Renfrewshire there are two former records of single birds.

Curlew (*Numenius arquata*).—The Curlew was frequently seen, usually single birds.

Whimbrel (*N. phæopus*).—Mr. Robert Wilson heard a Whimbrel at the south-west corner of the dam on 17th August. I have only noted it once before at Balgray.

Other waders observed at Balgray in previous years, but not noticed this autumn, are—Grey Plover, Oyster-catcher, Jack Snipe, Little Stint, and Spotted Redshank.

Report on Fungus Forays, 1911.

By R. B. Johnstone and D. A. Boyd.

Two forays were carried out this year in conjunction with the Andersonian Naturalists' Society, viz., to the grounds of Eglinton Castle on 16th September, and to Jordanhill on 7th October. On both occasions the attendance was satisfactory, and at Eglinton the party was joined by several members of the North Ayrshire Field Club.

Owing to the dry weather which prevailed during the summer months, the hopes of mycologists for a good harvest of fungi were not very high; but at Eglinton Castle, due probably to the grounds being rather low-lying, moist, and well sheltered by trees, there was a very fair representation of the commoner species, so that we were able to make up a list of about 80. It may be remarked that, from a mycologist's point of view, the grounds at Eglinton appear to present almost ideal conditions, and in a year more favourable to the growth of fungoid plants would doubtless yield a rich harvest.

Among the more uncommon or notable species observed at Eglinton were *Lepiota cristata*, *Mycena hæmatopoda*, *M. stylobates*, *Nolanea pisciodora*, *Pholiota spectabilis*, *Flammula carbonaria*, *Inocybe geophylla*, *Lactarius glyciosmus*, *Clitocybe maxima*, *Polyporus giganteus*, *P. intybaceus*, *Trametes mollis*, *Typhula Grevillei*, *Ithyphallus impudicus*, *Mutinus caninus*, *Ustilago utriculosa*, *Xylaria polymorpha*, *Ramularia epilobii*, and *Cercospora ii.*

The grounds at Jordanhill proved to be practically barren. Only some 12 species were noted, of which the most important were *Psaliota campestris*, *P. hæmorrhoidaria*, and *Polyporus melanopus*. There is not much wood on the estate, but in a more favourable year it might possibly be found to be a good place for pasture fungi.

Additions to the List of Mosses of Dumbartonshire.

By John R. Lee.

[Read 31st October, 1911.]

Since the publication in 1901 of the List of Mosses in the British Association *Handbook of the Fauna, Flora, and Geology of the Clyde Area*, there has appeared the *Census Catalogue of British Mosses*, issued by the Moss Exchange Club (1907), in which the distribution of each species is indicated, according to the Watsonian system of "vice-counties," so far as recorded up to the date of publication. An examination of these records, in reference to Dumbartonshire (v.-c. 99), reveals the fact that a considerable number of species—some of them quite common forms—are unrecorded for that county, showing that this part of Clydesdale has not been fully searched by local bryologists.

The north-western portion of the county, extending along the western side of Loch Lomond, and comprising the parishes of Luss and Arrochar, is particularly rich in mosses; but while the Arrochar district especially has long been the happy hunting-ground of bryologists, nearly all the most interesting species recorded from that vicinity have been gathered on the Argyllshire side of the boundary. A number of species common in the locality thus appear in the list as occurring in Argyll (v.-c. 98), and are omitted from v.-c. 99. This, however, only partly accounts for the imperfections of the Dumbartonshire list, for one or two additions now fall to be made from the more eastern part of the county as well. The present list, compiled from the results of recent observations, is intended to fill up a few of the gaps, and, doubtless, further additions may be expected. The localities from which these records have been obtained are mostly within the area to the north-west already mentioned; a few, however, are in the vicinity of Milngavie, within easy reach of Glasgow.

In the British Association List localities are in some instances given, and in the cases where additional localities within the county have been noted, the species is included here, with the

new locality specified. Those species and varieties not recorded in the *Census Catalogue* for v.-c. 99 are marked with an asterisk (*).

I am indebted to Mr. J. G. Robertson and Mr. St. John Marriott for the records indicated by their names, and, in cases where the sign ! occurs, I have had the opportunity of verifying the specimen. Where not otherwise stated, the records have been obtained by myself.

* **Tetraphis pellucida**, Hedw. Near Arrochar (Robertson).

* **Ditrichum flexicaule**, Hampe. Whistlefield (Marriott !).

Swartzia montana, Lindb. Previously recorded from near Arrochar, and probably frequent in the hilly region between Loch Lomond and Loch Long. This species was found at an excursion of this Society in August, 1906, by Mr. D. A. Boyd and myself at Finnart, Loch Long, very little above the level of the sea.

* **Dicranella rufescens**, Schp. Arrochar (Robertson).

* **D. varia**, Schp. Whistlefield (Marriott).

* **Rhacomitrium heterostichum**, Brid.—var. **gracilescens**, B. & S. Arrochar (Robertson !).

* **Weisia viridula**, Hedw. Arrochar.

* **Anæctangium compactum**, Schwaeg. Glen Douglas and Arrochar, abundant.

Orthotrichum anomalum, Hedw.—var. **saxatile**, Milde. Varieties are not distinguished in the 1901 list, but this species is not there recorded as occurring in section "B" which includes the Loch Lomond area. This variety, which apparently is everywhere in this country more common than the type, occurs abundantly on walls near Luss, and also at Clober, near Milngavie. Both the type and the variety, however, appear in the *Census Catalogue* as Dumbartonshire mosses.

* **Funaria ericetorum**, Dixon. In the woods below Arrochar.

* **Bartramia Œderi**, Swartz. In the woods below Arrochar.

B. Halleriana, Hedw. This plant is probably more common than is usually supposed. It is not given in the British Association's 1901 list as found in the Loch Lomond area. In the spring of this year it was gathered in the woods below Arrochar and I previously found it on the banks of Loch Lomond, near Tarbet.

* **Leptobryum pyriforme**, Wils. Near Garelochhead.

* **Webera polymorpha**, Schp. Glen Douglas.

* **W. elongata**, Schwaeg. Arrochar (Robertson). Glen Douglas.

* **W. Ludwigii**, Schp. I found this species in 1904 on the eastern slope of Ben Vane, and exhibited the specimen at a meeting of this Society (see *Transactions* Vol. VII. (N.S.), page 210.) At that time I was under the impression that the whole of this mountain was included in Argyllshire, but I find on reference to the one-inch Ordnance map that the county boundary runs along the watershed at the top of the ridge, so that the record comes within the area of Dumbartonshire.

* **Bryum roseum**, Schreb. Abundant in the woods below Arrochar (where it was first found, in 1907, by the late Mr. Chas. Scott), also in Glen Loin.

* **Mnium serratum**, Schrad. Glen Douglas.

Neckera crispa, Hedw. Arrochar (Robertson). Not recorded for this part of the district in the British Association list.

Habrodon Notarisii, Schp. Mr. D. A. Boyd's record from Rosneath, in the *Glasgow Naturalist*, Vol. I., page 52, adds an additional Dumbartonshire locality for this rare species, the previous record for the county being by Mr. R. D. Wilkie from Rossdhu.

Orthothecium rufescens, B. & S. This species was found on the roadside below Arrochar at an excursion of the Andersonian Naturalists' Society in the spring of the present year, nearly at sea-level—an exceptional locality for a species usually affecting alpine habitats. Previously recorded from Glen Douglas.

* **Eurhynchium prælongum**, Hobk.—var. **Stokesii**, Brid. Inchconnachan, Loch Lomond.

* **E. murale**, Milde. Clober, near Milngavie; and Arrochar. Probably occurring elsewhere in the county, but overlooked.

* **Amblystegium serpens**, B. and S. Wall at Clober, near Milngavie.

* **A. fluviatile**, B. and S. On stones in the Craigton Burn, above Milngavie.

* **Hypnum stellatum**, Schreb.—var. **protensum**, Rohl. Woods in Glen Loin.

* **H. falcatum**, Brid. Hills above Mambeg.

* **H. cupressiforme**, L.—var. **ericetorum**, B. & S. Arrochar (Marriott).

H. callichroum, Brid. Aldochlay, near Luss; Glen Douglas; and Arrochar.

H. crista-castrensis, L. Ben Voirlich; Loch-an-Uaine. Not recorded in the British Association list as a Clydesdale moss.

H. cordifolium, Hedw. Arrochar, c. fr. (Robertson).

Hylocomium brevirostre, B. & S. Abundant in the woods below Arrochar, and in Glen Loin; probably common throughout the county, although not recorded in the British Association list for this part of the district.

Mycological Notes.

By D. A. Boyd.

[Read 26th September, 1911.]

Additional Records of Fungi.

The following notes relate chiefly to species which have recently come under my notice, either amongst material obtained at excursions of this and kindred societies, or during visits to various localities in the West of Scotland. An asterisk is prefixed to the names of species which do not appear to have been previously reported for the Clyde Area.

Thanks are due to all who have supplied information or specimens, or aided in the identification of species; also to Mr. R. B. Johnstone, Hon. Secretary of the Andersonian Naturalists' Society, for permission to include in this paper the results of mycological observations made at various excursions of that Society. Records due to the last-mentioned source are denoted by the sign "†" prefixed to the respective localities cited.

* *Phlebia albida*, Fr.—On a fallen trunk; Corsinkell Glen, Stevenston (Ayrshire). Identified by Mr. Carleton Rea, B.C.L., M.A.

* *Clavaria luteoalba*, Rea.—On the ground in a wood; Stevenston. Identified by Mr. A. D. Cotton, F.L.S.

* *Plasmopara pusilla* (De Bary) Schröt.—On *Geranium pratense*; Kilwinning.

Peronospora effusa (Grev.) Rabh.—On *Atriplex*; † sea-shore at Scalpsie Bay, Bute.

P. alta, Fckl.—On *Plantago major*; † Baldernock (Stirlingshire).

Synchytrium stellariæ, Fckl.—On *Stellaria media*; Lochwinnoch (Renfrewshire).

Ustilago longissima (Sow.) Tul.—On *Glyceria fluitans*; † Baldernock.

Puccinia arenariæ (Schum.) Wint.—On *Arenaria trinervia*; Lochwinnoch.

Milesia polypodii, B. White.—On *Blechnum Spicant*; † Torrance (Lanarkshire).

* *Rhytisma andromedæ* (Pers.) Fr.—On *Andromeda polifolia*; † Lenzie Moss. Found by Mr. H. G. Cumming.

Cenangium abietis (Pers.) Rehm.—On dead bark of *Pinus sylvestris*; † between Cleghorn and Cartland Crags (Lanarkshire).

Scleroderris livida (B. & Br.) Mass.—On dead bark of *Pinus sylvestris*; West Kilbride.

* *Belonidium excelsius* (Karst.) Phil.—On dead culms and sheaths of grass; West Kilbride.

Helotium marchantiæ (Berk.) Fr., var. *conocephali*, Boyd.—On *Conocephalus conicus*; † Torrance; † Campsie Glen.

Tapesia rosæ (Pers.) Fckl.—On dead branches of *Rosa*; † Baldernock.

* *Lachnea hemispherica* (Wigg.) Gill.—On the ground amongst moss; Stevenston. Identified by Mr. Carleton Rea.

Mitrula viridis (Pers.) Karst.—"Scotstoun Woods; Mr. Gregorson."—Prof. T. King, MS. note.

Vibrissea truncorum (A. & S.) Fr.—On wet decaying wood; † Loch Loskin (Argyllshire). Found by Mr. H. G. Cumming.

Geoglossum difforme, Fr.—"Howwood, October, 1882."—Prof. T. King, MS. note.

Erysiphe Martii, Lév.—On *Trifolium medium* and *Lathyrus pratensis*; † Baldernock.

Massarina eburnea (Tul.) Sacc.—On dead bark of *Fagus sylvatica*; † Campsie Glen.

Mycosphærella ascophylli, Cotton.—On *Ascophyllum nodosum*; † Scalpsie Bay.

Xylaria polymorpha (Pers.) Grev.—On rotten wood; West Kilbride.

Valsa ambiens, Pers.—On dead bark of *Fagus sylvatica*; † Torrance ; † Campsie Glen.

Phyllosticta sambuci, Desm.—On *Sambucus nigra* ; † Baldernock.

Ph. glechomæ, Sacc.—On *Nepeta Glechoma*; † Dundonald; Lochwinnoch.

Ph. ajugæ, Sacc. & Speg.—On *Ajuga reptans*; † Dundonald; Lochwinnoch.

Camarosporium macrosporum (B. & Br.) Sacc.—Under bark of dead twigs of *Philadelphus coronarius* ; † Torrance.

Ascochyta pisi, Lib.—In withered spots on living legumes of *Pisum sativum* ; Stevenston ; Perceton (Ayrshire).

Leptothyrium periclymeni (Desm.) Sacc.—On leaves of *Lonicera Periclymenum* ; Lochwinnoch.

Discella carbonacea (Fr.) B. & Br.—On dead twigs of *Salix*; † East Kilbride.

Oidium alphitoides, Griff. & Maulb.—On living leaves of *Quercus Robur* ; West Kilbride ; Dalry ; Lochwinnoch.

*Botrytis depræda*ns, Cooke.—On living leaves of *Acer Pseudoplatanus*, forming large greyish spots ; Lochwinnoch.

Ovularia doronici, Sacc.—On leaves of *Doronicum* ; Largs.

Bostrichonema alpestre, Cés.—On leaves of *Polygonum viviparum* ; Glen Falloch.

* *Ramularia Winteri*, Thüm.—On *Ononis arvensis*; Stevenston. Identified by Miss A. Lorrain Smith, F.L.S.

R. valerianæ (Speg.) Sacc.—On *Valeriana officinalis*; Lochwinnoch.

* *R. senecionis* (B. & Br.) Sacc.—On *Senecio aquaticus*; West Kilbride.

* *R. centaureæ*, Lindr.—On *Centaurea nigra* ; West Kilbride.

* *R. taraxaci*, Karst.—On *Taraxacum officinale* ; Largs.

* *R. macrospora*, Fres.—On *Campanula persicifolia* ; Largs. This and the three preceding species were identified by Miss A Lorrain Smith, F.L.S.

* *R. succisæ*, Sacc.—On *Scabiosa succisa* ; West Kilbride.

R. ajugæ, Niessl.—On *Ajuga reptans* ; Lochwinnoch.

R. epilobii (Schn.) Trail.—On *Epilobium montanum*; Lochwinnoch.

* *R. plantaginea*, Sacc. & Berl.—On *Plantago lanceolata*; Stevenston.

R. plantaginis, E. & M.—On *Plantago major*; Dalry; Lochwinnoch.

R. pratensis, Sacc.—On *Rumex Acetosa*; Largs; Lochwinnoch.

Hormiscium pithyophilum (Nees) Sacc.—On dead bark of *Taxus baccata*; Lanfine.

Cercospora ii, Trail.—On *Viola palustris*; † Eglinton Woods.

Isaria arachnophila, Ditm.—On a dead spider; † Dundonald.

* *Tuberculina vinosa*, Sacc.—On *Æcidium tussilaginis*; West Kilbride.

* *Ægerita candida*, Pers.—On rotten wood in a wet place; Ardrossan.

Microfungi observed in Kintyre.

The species included in the following list were observed in the neighbourhood of Carradale, during an afternoon's visit to that district on 11th July last. It is hoped that the list may prove interesting as a contribution to the mycology of a portion of the Clyde Area regarding which almost no information has as yet been published.

Peronospora sordida, Berk.—On *Scrophularia nodosa*.

Synchytrium stellariæ, Fckl.—On *Stellaria media*.

Entyloma microsporum (Ung.) Schröt.—On *Ranunculus repens*.

Uromyces limonii (D.C.) Wint.—As Uredo on *Armeria maritima*.

U. rumicis (Schum.) Wint.—As Uredo on *Rumex obtusifolius*.

Puccinia menthæ, Pers.—On leaves of *Mentha*.

P. primulæ (D.C.) Wint.—On *Primula vulgaris*.

P. rubigo-vera (D.C.) Wint.—As Uredo on *Holcus mollis*.

P. hieracii (Schum.) Wint.—As Uredo on *Cnicus lanceolatus*.

P. oblongata (Link) Wint.—As Uredo on *Luzula maxima*.

Melampsora hypericorum (D.C.) Wint.—As Uredo on *Hypericum Androsæmum*.

Coleosporium campanulæ (Pers.) Wint.—As Uredo on *Campanula rotundifolia*.

C. euphrasiæ (Schum.) Wint.—As Uredo on *Euphrasia officinalis*.

Milesia polypodii, B. White.—On *Blechnum Spicant*.

Trochila craterium, Fr.—On dead leaf of *Hedera Helix*.

T. lauro-cerasi (Desm.) Fr.—On dead leaf of *Prunus Laurocerasus*.

Pseudopeziza trifolii (Bernh.) Fckl.—On *Trifolium repens*.

Orbilia marina (Phil.) Boyd.—On stranded fronds of *Ascophyllum nodosum* decaying on the beach.

Dasyscypha calycina (Schum.) Fckl., var. *Trevelyani*, Cke.—On dead bark of *Larix europæa*.

Podosphæra oxyacanthæ (D.C.) De Bary.—Conidia on *Cratægus Oxyacantha*.

Phyllachora graminis (Pers.) Fckl.—On leaves of *Dactylis glomerata*.

Diaporthe pulla, Ntke.—On dead branches of *Hedera Helix*.

Phyllosticta ajugæ, Sacc. & Speg.—On *Ajuga reptans*.

Cytispora lauro-cerasi, Fckl.—On a dead leaf of *Prunus Laurocerasus*.

Septoria stellariæ, Rob. & Desm.—On *Stellaria media*.

S. urticæ, Desm. & Rob.—On *Urtica dioica* and *U. urens*.

Glœosporium fagi, Desm. & Rob.—On leaves of *Fagus sylvatica*.

G. paradoxum (De Not.) Fckl.—On dead leaves of *Hedera Helix*.

Oidium erysiphoides, Fr.—On various living plants.

O. monilioides, Link.—On *Dactylis glomerata*.

Ovularia obliqua (Cke.) Oud.—On *Rumex obtusifolius*.

Didymaria didyma (Ung.) Schröt. (= *D. Ungeri*, Corda).—On *Ranunculus repens*.

Ramularia variabilis, Fckl.—On *Digitalis purpurea*.

R. ajugæ, Niessl.—On *Ajuga reptans*.

R. taraxaci, Karst.—On *Taraxacum officinale*. Verified by Miss A. Lorrain Smith.

Notes.

Great Snipe (*Gallinago major*) in East Renfrewshire.—A Great Snipe was shot near the High Dam, Eaglesham, on 23rd August, 1911, as I have been kindly informed by Mr. Allan Gilmour, of Eaglesham. This specimen, the third obtained on this estate, was exhibited at the September meeting of the Natural History Society of Glasgow.—John Robertson.

Crossbills (*Loxia curvirostra*) **on Loch Fyneside and Loch Longside.**—A correspondent of *The Glasgow Herald*, writing from Strachur, Loch Fyne, on 27th November, 1911, says that a dozen Crossbills were seen there "last week." Mr. Chas. Kirk, taxidermist, tells me that half a-dozen were seen recently at Arddarroch, Loch Long, and that one was sent to him.—John Paterson.

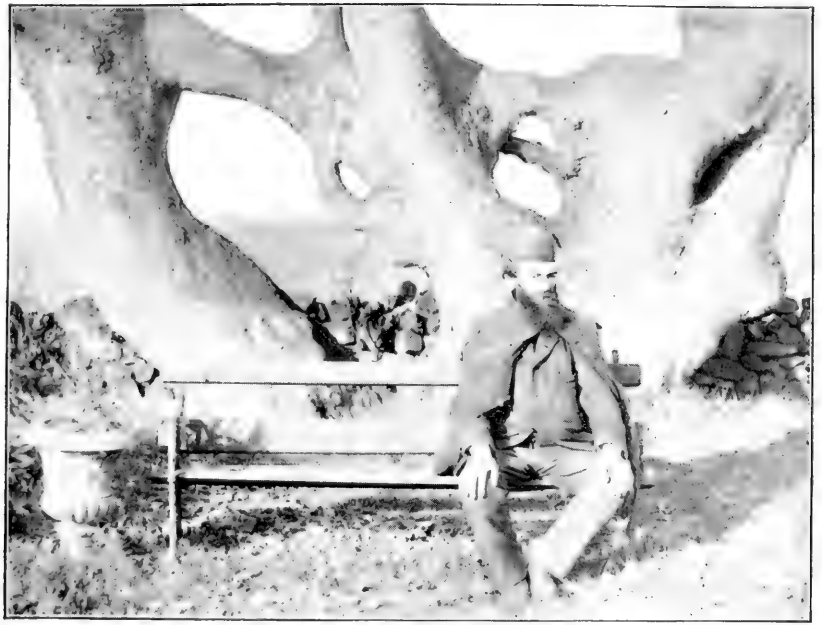
Bewick's Swan (*Cygnus bewicki*) **at Possil Marsh and Bardowie Loch.**—On 12th November, 1911, I saw four Bewick's Swans at Possil Marsh (Lanarkshire). On approaching to within eighty yards of them, they became perceptibly restless, and after uttering a few low notes they took wing. Before departing in a northerly direction, they circled the marsh two or three times, and seemed loath to leave. The Bewick's Swans were not fraternising with a herd of eighteen Mute Swans, six of whom were in the grey immature dress. On visiting Bardowie Loch (Stirlingshire) an hour later, I found, as expected, the four Bewick's Swans. Mr. Harry Cumming, I am informed, saw eleven of those birds at Bishop Loch, Gartcosh (Lanarkshire), on 19th November.—Hugh W. Wilson.

Late appearance of the Common Sandpiper (*Totanus hypoleucus*).—On the 14th October, 1911, Mr. Robert Henderson and I visited Bishop Loch. The waters were very low, and just below Lochwood House, at what Mr. Murdoch, the keeper, called the "Old Ford," there was a dry tract extending to the Asylum shore. Duck were not so numerous as they usually are at this time of the year, three species only being observed: Mallard (*Anas boscas*), which were well represented, Teal (*Nettion crecca*), sparsely, and about half a dozen Shovelers (*Spatula clypeata*). As the water level was so low, we determined to walk round the loch. On approaching the "Ford" we disturbed a small flock of Dunlin (*Tringa alpina*), not more than twenty in number, which flew towards the mud-flats at the south-west. On the Asylum ground and just below the buildings, our attention was drawn to a solitary wader foraging along the margin of the water. We stalked it, and got within a few yards before it took to wing and flew to a small islet near. We had ample opportunity of examining it closely, and found that, notwithstanding the late date and just as we had thought on first seeing its movements, it was a Common Sandpiper.—Alex. Ross.

Remarkable example of inosculation in the Great Maple (*Acer Pseudo-platanus*). A reproduction from a photograph of a curious case of inosculation at Monkredding, Ayrshire, is given on Plate II. The photograph was kindly sent to me by Mr. Arch. Shanks, Dalry, who says that Mr. John Smith, who formerly resided at Monkredding, writes regarding these trees as follows:—"The row of large Sycamores at Monkredding had, in their youth, been all grafted together, and this accounts for the fantastic forms of those that still remain standing." A glance at the picture will show, however, that inosculation of some branches has taken place in comparatively recent times. Mr. John Renwick tells me that in 1901 the trunk of this Great Maple or Sycamore measured thirteen feet in length, in a horizontal line. Mr. Renwick sent a photograph of this curiosity to Dr. Henry, Cambridge University, who wrote about it as follows:—"The Sycamore at Monkredding is very peculiar, and I can give no explanation except that possibly there may have been three trees originally—or three shoots from one stool, if original tree was cut down early—and that inosculation followed on close proximity of basal branches. I have seen nothing so curious." There is a Great Maple at Glendoune (Ayrshire) well known to some of the members of our Society, which, Mr. Renwick tells me, had, in 1898, a base 8 feet 8 inches long, from which four stems arise. Remarkable though the Glendoune tree may be, it is, however, eclipsed in interest by the fantastic Monkredding one illustrated on Plate II.—John Paterson.

The Black-tailed Godwit (*Limosa belgica*) **in Ayrshire.** On 10th September, 1911, I was with Mr. John Robertson at Balgray Dam (E. Renfrew) where we had under observation for some hours four Black-tailed Godwits. On 17th September, at Troon north shore, I saw two of the same species.—M. Galloway, 5 Westbank Quadrant, Hillhead, Glasgow.

Note.—The Black-tailed Godwit is new to the avi-fauna of Ayrshire. Mr. John Robertson informs us that there were but two Black-tailed Godwits left at Balgray on 17th September, and he thinks it likely that the two seen by Mr. Galloway on that date at Troon were two that had passed on from Balgray. We know that the usual line of flight in central Clyde, and probably over a wider area, is from north-east to south-west in autumn, so that Mr. Robertson's suggestion seems quite likely to be right.—*Eds.*



REMARKABLE INOSCULATION IN GREAT MAPLES (*Acer Pseudo-platanus*) AT MONKREDDING, AYRSHIRE.

The "Clyde" (Renfrewshire) record of *Stenamma westwoodi*. In the list of Aculeate Hymenoptera published in the Handbook of the Fauna, &c., of "Clyde" (1901), the name *Stenamma westwoodi* occurs with the record, "Misty Law, Renfrewshire (Taylor)," against it. Being at that time rather keenly interested in our Aculeata, and knowing of no other record of this ant for Scotland, I ventured to enquire on whose identification this rested. This elicited the following facts:—(1) that specimens in the Paisley Museum from the above locality (collected by Mr. J. M. B. Taylor in 1887) were named *Myrmica (Tetramorium) lippula* by the late Morris Young, curator; and (2) that this information having been supplied to Mr. J. R. Malloch, the compiler of the list, he entered the record under the name *Stenamma westwoodi*, of which *M. lippula* is a synonym.

By the courtesy of Mr. Taylor, who succeeded Mr. Young in the curatorship of the Paisley Museum, two of the specimens were sent to me in November, 1901, for examination, when I found them to be workers of the common *Myrmica rubra* race *ruginodis*. To strengthen my position, should my determination be called in question, I showed the specimens to the late Edward Saunders, and he replied, "These are certainly *ruginodis; Stenamma* is a much smaller, slenderer creature."

The specimens were returned, with our decision regarding them, in December, 1901, and, as nothing further has transpired during the ten years that have since elapsed, I feel that the record ought no longer to stand uncorrected in print.—William Evans, Edinburgh, 5th December, 1911.

Excursions.

GLEN WATER, DARVEL, August 6th, 1910.—Conductor, Mr. A. Gilchrist. The attendance at this excursion was a meagre one, only four members turning out. They were joined by two or three Darvel friends, and at Law Bridge the party was met by Mr. David Hastings, gamekeeper. Unfortunately there was too much water running to enable the bed of the Glen Water to be followed, and after a short visit to what is supposed to be the the remains of a British fort, locally known as "Castle Lourie,"

the party was confined to the higher ground till the Mucks Water was reached, and in this way much of the beauty of the glen was not seen.

Few plants were picked up on the way, but several fine patches of *Epilobium angustifolium*, *Agrimonia Eupatoria*, and *Campanula latifolia* were noted, while during the afternoon some twenty species of Micro-Fungi were gathered by Mr. D. A. Boyd. Mr. Hastings showed a number of plants he had gathered that morning, including *Hippuris vulgaris*, *Drosera rotundifolia*, and *D. anglica*, and he also showed a large specimen of the Adder (*Pelius berus*), which he had killed when gathering the plants.

Garelochhead, 17th September, 1910. — Conductor, Mr. W. R. Baxter. The objective at this excursion was Fungi, of which about thirty species were seen, including *Nyctalis parasitica*, which was common on dead Russulas, and *Fistulina hepatica*, of which, however, but one example was seen. A fine Ash tree near Mambeg pier was measured by Mr. Renwick (see Vol. III., p. 116).

Brodick Castle Woods, 26th September, 1910.—Conductor, Mr. W. R. Baxter. Only four members attended the excursion on the Autumn Holiday. Many interesting trees were noted in the grounds of Brodick Castle, and the following measurements were made by Mr. Renwick and Mr. M'Kay :—

Name.	Girth.		At		Bole.	Height.	Spread.
	Ft.	In.	Ft.	In.	Ft.	Ft.	Ft.
*Gean (*Prunus Avium*),	12	1¼	3	0	5	—	74
†Oriental Plane (*Platanus orientalis*) - -	4	9½	4	3	5½	—	—
Silver Fir (*Picea pectinata*),	15	0	5	0	—	106	—
Do. do.,	14	11½	5	0	—	110	—
Do. do.,	13	9½	5	0	—	110	—
‡Larch (*Larix europæa*),	14	11½	5	0	—	90	—

* This shows an increase of 2 feet 2¼ inches in girth and 11 feet in spread since it was last measured, fourteen years ago.

† This is the only one in Arran. Dr. Landsborough states that it was much broken by a storm in the Winter of 1894.

‡ This is the largest Larch which Mr. Renwick has measured in "Clyde."

Name.	Girth. Ft.	Girth. In.	At Ft.	At In.	Bole. Ft.	Height. Ft.	Spread. Ft.
Wellingtonia (*Sequoia gigantea*), - -	8	10½	5	0	—	76	—
Araucaria (*Araucaria imbricata*), - -	6	6½	5	0	—	46	—
Do. do.,	6	1¾	5	0	—	40	—
Himalayan Weeping Spruce (*Picea Morinda*), -	6	3½	5	0	—	50	—

The Wellingtonia, Araucarias, and Weeping Spruce were planted in 1854 or 1855. A Cork Oak (*Quercus Suber*) was seen, but could not be measured, as it is surrounded by a railing to protect it from the ravages of visitors, who used to carry away chunks of it. Mr. Inglis, the forester, who acted as guide to our party, measured this tree for Dr. Landsborough in 1905, when it showed a girth of 5 feet 4 inches at 5 feet, height 27 feet, and spread 30 feet.

The district is very rich in Fungi, and a large number of species was observed. Among the most conspicuous were *Boletus elegans*, which abounds in the Larch woods behind the Castle, and *Hygrophorus calyptræformis*, a beautiful species with a rose-coloured cap and white stem, which was plentiful on the lawns, growing in company with the commoner *H. coccineus*, which it greatly outnumbered. Several fine specimens of *Paxillus giganteus* were found, and a few tufts of *Clavaria fumosa*. The last named species is not included in the late Mr. Wm. Stewart's list of Fungi in the *British Association Handbook* (1901), and is probably a new record for the "Clyde."

Mr. J. J. F. X. King, F.E.S., reports that among the insects taken by him were:—

HOMOPTERA — *Aphrophora alni* and *Ptycus spumarius*; HEMIPTERA—*Campyloneura virgula* and *Anthocoris nemorum*; PSOCIDÆ—*Graphopsocus cruciatus*, *Philotarsus flaviceps*, *Cœcilius flavidus*, *Amphigerontia bifasciata*, and *Stenopsocus immaculatus*; DIPTERA—*Lipoptena cervi*, and several species of Phoridæ.

TULLICHEWAN CASTLE, BALLOCH, 1st October, 1910, and CADZOW HIGH PARKS, HAMILTON, 8th October, 1910.—The excursions to these localities took the form of Fungus Forays in conjunction with the Andersonian Naturalists' Society. The

weather was fine, but the results disappointing, especially those obtained at Tullichewan, where the woods were closed for shooting. In a small glen at Cadzow abutting on the park containing the white cattle there was an enormous quantity of *Armillaria mellea*. At both places *Tricholoma imbricatum* was found. Other notable Fungi at Cadzow were *T. nudum*, *Mycena capillaris*, and *Polyporus intybaceus*, and at Tullichewan *P. varius*.

Arrochar and Ardgartan, 17th April, 1911.—Conductor, Mr. John Renwick. This excursion was carried out in wretched weather. The great Ash tree at Ross's Hotel was the first object of special interest met with (for measurements, see Vol. III., pp. 110 and 116). Ardgartan, which now forms part of the Colquhoun Estates, was next visited. Before entering the policies, attention was directed to the sides of the bridge over the Croe being completely covered with *Asplenium Trichomanes*. The celebrated Spanish Chestnut (*Castanea sativa*) was found to measure 21 ft. 6½ in. at 6 ft. and 22 ft. 1½ in. at 5 ft., an increase of say 4 in. in 10·3 years = ·39 inch per annum.

In the *Transactions of the Botanical Society of Edinburgh*, November, 1892, Dr. David Christison wrote:—"Probably this was the finest and most promising Spanish chestnut in Scotland until a few years ago. In 1867 Sir Robert Christison described it as having a tall beautiful trunk, without humps, 20 feet in girth at 5 feet up. Unfortunately a storm in 1875 broke it over and reduced its height from 100 to 70 feet. He found, nevertheless, in 1877, that the girth had increased 8 inches since 1867, and that the foliage was still dense and healthy. In 1879, Mr. James Gordon, gardener at Luss, found the girth at 7 feet up to be 19 feet 10½ inches."

Between the house and the large Chestnut is a much younger tree of the same species. For the purpose of comparing their rates of growth, it was measured in July, 1903, when it girthed 9 feet 3¼ inches at 3 feet up, this point being chosen as it was free from a swelling caused by a branch which had been cut off at about 5 feet up. It has increased 7¼ inches since then, an average of an inch in a year.

A Yew tree (female) (*Taxus baccata*) has a bole of 9 feet

and a girth at 2 feet 6 inches of 11 feet $2\frac{3}{4}$ inches, an increase of 3 inches since July, 1903. A Beech (*Fagus sylvatica*) to north of house, below the old river bank, girths 13 feet $1\frac{1}{2}$ inches at 5 feet. In 1899 it had a girth of 12 feet 6 inches, a height of 77 feet, and a spread of 84 feet.

Near the torpedo factory a White Wagtail (*Motacilla alba*) was seen. The Stonechat (*Pratincola rubicola*) was seen, and the Meadow-Pipit (*Anthus pratensis*) was still in flocks in Ardgartan policies and at the head of the loch. In the boat-house wood, a little farther down the loch than the policies, two nests of the Heron (*Ardea cinerea*) were seen, but it is very doubtful if they were occupied.

The valley of the Croe is very interesting from a geological point of view. It appears to Mr. Renwick to be part of an old river-valley system that was in existence when the land stood, relatively to the sea, many hundred feet higher than it does now, and when the watershed was much farther to the west than it is at present. The valleys now occupied by Loch Long and Loch Lomond were merely tributary to an old river that flowed eastward by Glen Croe, the Arrochar-Tarbet gap, Glen Dubh, and the Forth, to join the northward extension of the Rhine. Since then, both hills and valleys have been very extensively and unequally worn down, and the drainage system greatly altered. About the point where the line of this supposed old river crosses Loch Lomond the loch is now over 600 feet deep, while the hill on the eastern side of the loch is about 1,100 feet high, which implies a difference in wastage of 1,700 feet, truly a very big difficulty to get over ere we can accept the theory. Coming nearer home we have a reverse instance. The pre-glacial channel of a river-valley near Garscadden has been filled up with sand and gravel to a depth of 300 feet.

BLAIR, DALRY, 1st April, 1911.—Conductor, Mr. Arch. Shanks. This excursion took place in fine weather, and was attended by twenty members and friends. The gardens at Blair were inspected, but, owing to the early visit, few plants were in bloom. The flower of *Gunnera scabra* was examined, and Mr. Mair, the gardener, informed the company that leaves on this plant have been measured ten feet across.

Mr. Renwick measured the following trees :—

Name.	Girth.		At		Bole.	Height.	Increase in Girth in 16 years.	
								Rate per annum.
	Ft.	Ins.	Ft.	Ins.	Ft.	Ft.	Ins.	Inch.
Magnolia, - -	3	5½	5	0	—	46	—	—
Sycamore, "Hanging Tree" (*Acer Pseudo-platanus*),	11	9½	5	9	14	—	6½	·41
Ash (*Fraxinus excelsior*),	12	2½	5 9 (high) / 7 0 (low)		9	84	10¼	·64
Wych Elm (*Ulmus montana*),	11	5	5	4	14	67	—	—
Do., - -	12	9½	4	3	9	—	7	·44
Small-leaved Elm, -	7	8	5	0	16	—	—	—
Hornbeam (*Carpinus Betulus*),	6	8¾	5	0	7	—	—	—
Do., - -	6	2	3	6	7	—	—	—
Oriental Plane (*Platanus orientalis*),	5	3½	5	0	20	—	—	—
Yew, female, (*Taxus baccata*),	10	3	1	0	6½	—	6	·37

Pulmonaria officinalis was found in flower near the Plane. A visit was paid to a fine group of Wellingtonias (*Sequoia gigantea*) in the hope of hearing the Chiffchaff which is sometimes heard there on this date, but no *Phylloscopus rufus* obliged.

Hindog Glen, Dalry, 22nd April, 1911.—Conductor, Mr. Arch. Shanks. Fourteen members and friends took part in this outing. The route followed took the party by the public park. On an Elder Tree growing at the "Sick House" the Jew's-ear Fungus (*Hirneola Auricula-Judæ*) was noted. The Hindog Glen was entered above Ryefield. It favourably impressed all present as a likely hunting-ground for naturalists. Spring flowers were abundant. There was a fine display of the graceful Prickly Shield Fern (*Aspidium aculeatum*). The Scottish Filmy Fern (*Hymenophyllum unilaterale*) was also observed. Bistort (*Polygonum Bistorta*) was seen though not in flower, also *Petasites albus* in flower on the banks of the Potyan Burn. A Swallow (*Hirundo rustica*) was seen, and the Cuckoo (*Cuculus canorus*) heard. Aitnock Fort and Cunningham Baidland Quarry (where sponge spicules were first found fossil by Mr. John Smith) were both visited.

Proceedings of the Society.

THE first meeting of the sixty-first session of the Society was held in the Rooms, 207 Bath Street, on 26th September, 1911, Mr. John Paterson, President, in the chair.

Mr. Wm. Baird, M.A., 60 Durward Avenue, Shawlands, was elected an ordinary member.

Reports of excursions to Rawyards and Rosemount by Mr A. B. Motherwell, and Blantyre Priory by Mr. Thomas Wise, were read.

Mr. Frank M'Culloch sent for exhibition, by favour of J. D. Graham, Esq., a Marsh-Harrier (*Circus æruginosus*) which was caught by accident on Mr. Graham's shooting at Cardross House, Port of Menteith. The species is well known to Mr. Graham from his experience in the Spanish Peninsula, and the bird exhibited had been observed in the neighbourhood in which it was captured for a considerable time. Mr. M'Culloch also sent for exhibition a Great Snipe (see p. 18).

Mr. W. R. Baxter exhibited a collection of fungi from Brodick, the most interesting being *Rhizina inflata*, Schaeff., which had been found in larch plantations at (1) Brodick Castle, (2) Glen Shirag, and (3) Lag-a-bheith, Old Lamlash Road, Brodick, on bare sandy ground and on bare sides of drainage cuttings.

Mr. James J. F. X. King, F.E.S, exhibited specimens of Scottish longicorn beetles:—*Criocephalus rusticus* and *Leptura sanguinolenta*—two males and two females of each, from Nethy Bridge.

Mr. R. S. Wishart, M.A., exhibited a freak in the growth of a potato plant, in which all the tubers were produced upon the foliage-clad branches above the ground, some of them being found at the very apex of the stem. This exhibit was sent to Mr. Wishart by Dr. Schlomka from Whiting Bay, Arran.

Mr. Hugh Boyd Watt, M.B.O.U., sent for exhibition foliage and fruit of the Catalpa (*Catalpa bignonioides*, Walt.), and some notes on the various species of this tree which are grown in London and neighbourhood. He pointed out, that the generous sunshine of this summer and autumn, had led to the development of the conspicuous and remarkable fruit of this tree to an unusual extent—in inclement years none is seen. When there is a good crop, as was the case in 1906, the fruit hangs on the branches long after the leaves are gone, and through the winter the long

"pods" are most striking objects. The tree was introduced in 1726, and the reputed oldest in London, miscalled Raleigh's or Bacon's Tree, stands in Gray's Inn Garden. Mr. Watt referred to a fine old Catalpa in the Terrace Gardens, Richmond, formerly the gardens of Buccleuch House. This tree is one of the largest known to Mr. Watt, and its trunk at 3 feet measures 8 feet 1 inch, estimated height 35 feet, spread of branches north to south 19 paces. It has apparently seen its best days. In London the Catalpa flowers from mid-July to mid-August, and in a late year till September. Leaves of *Catalpa Kaempferi*, Sieb. & Zucc., a Japanese species introduced in 1862, were exhibited. A tree of this kind at Syon House, probably the finest in cultivation, is 57 feet 10 inches high, and has a trunk 4 feet 11 inches in girth (A. Bruce Jackson. *Catalogue of Syon House Trees and Shrubs* (1910), p. 7).

Mr. Watt also sent foilage and fruit of one of the "true" Service Trees (*Pyrus torminalis*) from Hertfordshire, a native tree almost entirely unknown to Glasgow botanists.

Mr. D. A. Boyd sent some mycological notes (see p. 14).

Mr. Hugh W. Wilson gave a lantern lecture on an ornithological trip to the Shetlands.

The Annual General Meeting of the Society took place on 31st October, 1911, Mr. John Paterson, President, in the Chair.

The President made appropriate reference to the loss sustained recently by the Society and the community by the death of Sir James King, Bart., who had been a member of the Society for about a quarter of a century.

The Annual Report of the Council was read. It showed that during the year fifteen ordinary members were added to the roll, while eight were removed owing to resignations, &c. Three associates had resigned. The membership at the end of session 1910-1911, was—

Honorary Members, - - - -	16
Corresponding Members, - - -	34
Ordinary-Life, - - - - -	18
Annual, - - - - - -	181
Associates, - - - - - -	5
Total, - - -	254

The specimens exhibited, and the papers read during the year, showed that great activity had obtained in successfully forwarding the objects for which the Society exists. Twelve excursions took place during the year, the attendance varying very much. The Hon. Treasurer (Mr. John Renwick) submitted an Abstract Statement of Accounts (p. 32). The Hon. Editor reported that the Society's publications were up to date at the end of the session just closed.

The following office-bearers were elected:—As President, Mr. John R. Lee; as Vice-President, Mr. D. A. Boyd; as Hon. Secretaries, Messrs. Alexander Ross and George Lunam; as Hon. Treasurer, Mr. John Renwick; as Hon. Librarian, Mr. James Mitchell; and as Members of Council, Messrs. P. Ewing, F.L.S.; J. R. Jack, M.I.N.A.; R. M'Lean, M.A.; and William Pettigrew. Messrs. Joseph Sommerville and James Jack were appointed Auditors.

Mr. James MacAulay, 9 Broomhill Avenue, Partick, was elected an Ordinary Member. The excursion to Carstairs House and grounds was reported on by Mr. James Whitton, that to Hag Burn and Loudoun Castle by Mr. John Gloag, and the fungus forays to Eglinton Castle grounds and Jordanhill by Messrs. R. B. Johnstone and D. A. Boyd (p. 10).

Mr. James J. F. X. King, F.E.S., showed specimens of *Agrion hastulatum*, Charp., from Aviemore. This rare dragon-fly has only been taken by one other British entomologist, Colonel Yerbury, who captured one specimen some years ago in the same locality. Mr. King also exhibited an interesting series of *Piezostethus formicetorum*, Boh., found in the nests of the ant *Formica rufa* at Nethby Bridge. In illustration of the remarkable vitality of insects in adverse circumstances, Mr. King showed a wasp from which the greater portion of the abdomen had been removed, evidently by the bite of a bird. The insect was alive when picked up, was provided with suitable food, and lived for at least four days after.

Dr. Thomas Beath Henderson exhibited Blackman's snake, *Pseudelaps diadema* (Schlegel), a species found in eastern and northern Australia, and the brown snake, *Diemenia textilis* (D. and B.), a species common to every part of Australia. He gave an interesting account of the structure and habits of these creatures, and remarked that the scales on the latter were the most beautiful he had seen on any reptile.

Mr. Anderson Fergusson exhibited *Creophilus maxillosus*, L., var. *ciliaris*, Steph., from Knoweside, Ayrshire. The specimen shown was taken on the shore at Knoweside in September, under the carcase of a bird, along with the type form. This is the first record of the occurrence of the variety in Ayrshire. It has already been recorded from the Clyde area as occurring on the shores of Arran *(Fauna and Flora of the West of Scotland)*; and its distribution in Scotland, according to Dr. Sharp's list of the Coleoptera of Scotland, is Tweed, Clyde, and Argyle. Fowler *(Coleoptera of the British Islands)* states that the variety has usually been regarded as confined to the North, but that he has a record from Deal, and there are other English records. Specimens of the type form from Arrochar were shown for sake of comparison. Mr. Fergusson also exhibited *Micralymma brevipenne*, Gyll., from Knoweside, Ayrshire. A single specimen of this maritime species occurred at Knoweside in September, on a rock which was surrounded by water at high tide. The species occurs exclusively on or near the coast, and is sometimes found beneath stones below high-water mark. It ranges from the Isle of Wight in the South to the Tay area in Scotland. It is recorded from Clyde by Dr. Sharp, but it is impossible to say from what part of the area the original record came, and its occurrence in Ayrshire is accordingly of interest.

Mr. Herbert D. Shields exhibited the Wandering Albatross (*Diomedea exulans*), the New Zealand Owl or More-Pork (*Ninox novæ-zealandiæ*) and the Parson-Bird or Tui (*Prosthemader novæ-zealandiæ*.

Messrs. R. W. S. and H. W. Wilson read a paper on "A Visit to Castle Loch, Mochrum" (p. 1), and Mr. John R. Lee one on "Some Additions to the List of Mosses of Dumbartonshire" (p. 11).

The third meeting of session 1911-12 took place on 28th November, 1911, Mr. John R. Lee, President, in the chair.

Lord Newlands, Mauldslie Castle, Lanarkshire, Mr. Frank Baker, 31 Regent Park Square, Strathbungo, and Mr. Robert Oswald Blyth, Balvonie, Skelmorlie, were elected Ordinary Members of the Society.

Mr. Thomas Beath Henderson, M.D., exhibited three East Indian Snakes—(1) Cobra di Capello (*Naia trepudians* (Merrem)), (2) Krait (*Bungarus candidus* (L.)), (3) Green Tree Viper (*Lachesis gramineus* (Shaw)). Dr. Henderson gave full descriptions of these species, and illustrated them with a series of admirable coloured drawings by Miss Henderson.

On behalf of Mr. Chas. Kirk, taxidermist, Mr. Hugh W. Wilson exhibited (1) a Grey Phalarope (*Phalaropus fulicarius*) ♂, from Dunure (Ayr), and (2) a Storm-Petrel (*Procellaria pelagica*) ♂, from near Kilbarchan (Renfrew). These birds had been blown ashore and inland by the great gale on 5th November, 1911. Other victims of the storm of the same species that had come to Mr. Kirk's hands were a Grey Phalarope from Girvan and a Storm-Petrel from Camis Eskan (Dumbarton). The exhibit further included a Green Sandpiper (*Totanus ochropus*) ♀, which was got about 16th August, 1911, near Strathaven (Lanark), and was shown by favour of Captain Finlay.

Mr. J. R. Jack, M.I.N.A., read "Some Notes on Colour Photography of Botanical Subjects," which were followed with close attention by a large audience, the usual meeting-place being quite full. In illustration of his remarks, Mr. Jack showed a series of colour pictures on the screen, which surpassed anything yet seen in this line at the Society's meetings.

ABSTRACT STATEMENT OF ACCOUNTS—SESSION 1910-1911.

1910.—Sept. 1.					
To Balance—Life Members' Fund—					
In Bank, - -	£162	15	0		
Ordinary Fund—					
In Bank and on hand, - -	88	4	7		
				£250	19 7
1911.—Aug. 31.					
To 152 Ordinary Members' Subscriptions, @ 7s. 6d., - - - - - - - -				57	0 0
,, 16 Members' Arrears, - - - - -				6	0 0
,, 2 Associates' Subscriptions, @ 5s., - -				0	10 0
,, 1 Associate's Arrears, - - - - -				0	5 0
,, Interest, - - - - - - - -				5	18 2
,, *Transactions* and *Glasgow Naturalist* sold, -				10	0 8½
,, Mitchell Library for *Glasgow Naturalist*, -				5	3 10
,, Donations—Illustration Fund, - - -				2	4 0
				£338	1 3½

From the Balance of £81 7s. 0½d. falls to be deducted cost of *Transactions* and *Glasgow Naturalist* for Three Sessions.

1911.—Aug. 31.					
By Rent and Attendance, - - - - - -				£7	10 0
,, Postage, Stationery, &c., - - - - -				15	4 11
,, Printing Circulars, - - - - - -				13	16 3
,, Printing *The Glasgow Naturalist*, vol. II., -				45	12 7
,, Carriage on *The Glasgow Naturalist* and *Transactions*, - - - - - - - -				1	16 7½
,, Library—New Books and Magazines, - - - -	£6	6	3		
Insurance, - - - -	0	12	0		
Binding, - - - -	1	5	0		
Postage, Stationery, &c.,	0	9	3½		
Boxes, - - - - -	0	5	4		
				8	17 10½
,, Marine Biological Association, - - -				1	1 0
,, Balance—Life Members' Fund in Bank, - - - - -	£162	15	0		
,, Balance, Ordinary Fund in Bank, - - £89 13 2					
Less due to Treasurer, 8 6 1½					
	81	7	0½		
				244	2 0½
				£338	1 3½

GLASGOW, *24th October*, 1911.—We have examined the Accounts, compared them with the relative Vouchers and Securities, and find them correct. Cash due to Treasurer, Eight pounds six shillings and one penny halfpenny.

(Signed) JOSEPH SOMMERVILLE, }
JAMES JACK, } *Auditors.*

The Glasgow Naturalist

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(Including the *Transactions* and *Proceedings* of the Society, Third Series).

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Loch Sween.

By J. GRAHAM KERR.

[Read 19th December, 1911.]

Some ten years ago, when searching the chart of the west coast of Scotland for suitable spots for marine zoological work, I was struck particularly by Loch Sween, a long fjord-like arm of the sea, which, opening out on to the Sound of Jura with its strong tidal currents, and possessing on the one hand numerous perfectly sheltered coves, and on the other narrow channels through which the tide might be expected to flow and ebb with considerable rapidity, seemed to possess features such as to make it almost ideal as a centre for work on marine organisms. My actual experience of Loch Sween, gained during summer vacations spent there in 1904, 1910, and 1911, and during repeated sojourns with my students during winter and spring, have completely fulfilled the anticipation aroused by the appearance of the chart, and I propose this evening to put before the society a short sketch of Loch Sween and its characteristics.

It is necessary as a preliminary to say a few words about the geological structure* of the country round Loch Sween for its configuration, and that of the loch itself, is intimately linked with geological structure. The country generally is composed of metamorphic rocks of the quartzite group, with numerous intrusive sills of epidiorite. The rocks are thrown into sharp folds, apparently approaching to the isoclinal in their nature. The long axes of these folds run approximately N.N.E. and S.S.W., while their axial planes are inclined at high angles,

*See Memoirs of the Geological Survey of Scotland No. 36, upon which my remarks here are based.

dipping in towards a line which runs N.N.E. from near the head of the main arm of the loch. Along this line the axial planes are vertical. The predominant cleavage planes are approximately parallel to these axial planes of the folds. This structure has, under the influence of long-continued denudation, given rise to an extraordinarily characteristic surface sculpturing. The comparatively resistent epidiorite sills crop out along lines running N.N.E. and S.S.W., and form prominent ridges between which the more weatherable rocks have been carved out into steep-sided valleys. About the western arm of Loch Sween—Kyle Scotnish—the cleavage planes dip to the E.S.E., and this gives in many cases a very characteristic appearance to the slopes of the ridges—the slope towards the E.S.E. having a smooth surface bounded by cleavage planes, while the escarpment towards the W.N.W. is littered with great fragments of rock broken off along cleavage- and joint-surfaces.

The country then presents a surface characterised by the very numerous parallel ridges separated by steep-sided valleys, a feature making it equally difficult to traverse in a S.E. or N.W. direction, and easy in a direction at right angles to this.

Running approximately at right angles to the general direction of the ridges and valleys are numerous basaltic dykes of Tertiary age, and these sometimes, by weathering away, produce gaps or passes through the ridges.

Loch Sween (like its neighbours Loch Craignish, Loch Killisport, and West Loch Tarbert), occupies the seaward end of a N.N.E. and S.S.W. valley of the type indicated. That these valleys, probably formed by the eroding action of streams at a period when the land was relatively higher than at present, and when the coast line was coincident with what is now the edge of the continental shelf, extend out to sea is probably indicated by their seaward prolongations being marked here and there by a deep hole (Loch Craignish 107 fathoms near Charsaig Island. Loch Sween 110 fathoms opposite Small Isles, Loch Killisport 120 fathoms about midway between the Sound of Islay and West Loch Tarbert). Conforming to the configuration of the ground already described, Loch Sween extends from its mouth as a straight inlet towards the N.N.E. From a point about a mile and a-half from the mouth where it is a mile-and-a-half wide it

broadens out somewhat, and for the greater part of its length is about three quarters of a mile in breadth. At a distance of about 6½ miles from the mouth the loch divides into four branches. On the N.W. is a deep bay, the inner part of which is connected by a rocky breakwater into a perfect natural harbour having the village of Tayvallich situated on its western shore. Next this is Kyle Scotnish, the longest arm, which extends for a distance of 2⅓ miles. Near its mouth Kyle Scotnish forms a narrow channel with in places only about one fathom of water at low tide, but beyond this it expands to form a spacious basin about 1½ miles by ¼-mile and with a maximum depth of about 6 fathoms. To the south-east of Kyle Scotnish, and separated from it by the densely wooded peninsula of Oib, is the main arm of the loch, on the N.W. side of which are the charming Fairy Islands—richly wooded and separated by muddy channels, some of which dry at low water. Finally there is the Achnamara arm of the loch—shorter and wider than the two arms just mentioned.

The best centre for zoological work is the village of Tayvallich which is absolutely sheltered, so that a boat can be used in all weathers, and which is within easy reach both of the main arm and of Kyle Scotnish. At this point also Loch Sween is separated only by a narrow isthmus about half a-mile in width from the Sound of Jura with its strong tidal currents and luxuriant fauna.

The maximum depth of Loch Sween is about 22 fathoms between Eilen Lon and the N.W. shore, *i.e.*, just outside the point where the loch broadens to divide into the four arms already alluded to. Most of the bottom of the loch—wherever in fact there is little current—is covered with a tenacious mud, comparatively poor in life. *Astropecten irregularis*, which is very common, and *Aphrodite aculeata*, also common but small in size, are, along with the brittle stars *Ophiocoma nigra* and *Ophiothrix fragilis*, conspicuous inhabitants of the muddy bottom. Towards the upper ends of the various arms of the loch the mud is covered with meadows of *Zostera*, and there animal life becomes abundant. Sometimes the conspicuous feature is afforded by the enormous numbers of *Echinus miliaris* perched on the blades of the sea-grass. At other times it is the Tectibranch mollusc, *Acera bullata*, which attracts attention. I know few more

charming zoological sights than that which is sometimes experienced on a calm day about Easter time when the Aceras are to be seen flitting through the water lightly as butterflies or Pteropods by the graceful movements of their parapodial fins which are stretched out to a size undreamt of by the inland laboratory naturalist.

Ascidians, such as *Botrylloides* and *Clavelina*, are common, though they vary in abundance a good deal from year to year. The years 1904 and 1911 were marked by an extraordinary abundance of *Clavelina*. Less conspicuous but still more abundant inhabitants of the Zostera-meadows are the tiny Tectibranch *Runcina hancocki* and the Chaetognath *Spadella cephaloptera*. *Spadella* at once excites attention as compared with its allies by its very active and apparently purposeful movements. It swims with great rapidity, pausing every now and then to attach itself by its cement-glands to the blade of *Zostera*. When an attempt is made to capture it with the pipette it avoids the indraught as skilfully to all appearance as a Teleostean fish would do.

The richest bottom-fauna is, however, to be found not on the mud but on those parts of the bottom where there is a considerable rush of tide, so that the bottom is rock or gravel. Rich ground of this kind is to be found off the S.W. end of Taynish Island, an island close to the N.W. side of the loch, at about the middle of its length, and opposite the mouth of the nearly land-locked Linne Vurich. In the shallow water channel between this island and the mainland, Mr. J. H. Parker and myself got, on April 8th, 1911, an excellent view of the spawning of the Lumpsucker (*Cyclopterus lumpus*). The fishes were in just about a foot of water, and we were able to get the boat close to them and watch the large lumbering female deposit her mass of orange-pink spawn, amidst the excited movements of the male. The spawning completed, the female languidly stole away while the male bustled about nosing at the spawn and apparently tidying things up, preparatory to his long vigil which lasts until hatching or even beyond, for, as is well known, he conducts the swarm of young fish about after hatching.*

* Mr. P. Jamieson tells me that he has watched the male conducting the swarm of young fry about, and that on any sudden alarm the young fish dash towards the parent and attach themselves all over his body by means of their suckers.

The richest ground in the loch, however, is in the narrow channel of Kyle Scotnish. The bottom here is for the most part gravel, shading off at either end into the mud characteristic of the wider parts of the loch. Two of the most conspicuous creatures on the gravel are the common Pecten (*opercularis*) and *Lima hians*. Great masses of Lima nests constructed of the pink calcareous alga *Melobesia* are brought up in the dredge. In the interstices between the fragments of *Melobesia* a great variety of smaller annimals are found, while in the chambers of the nest there is usually to be found living commensally with the Lima the polychaete worn *Siphonostoma*. But perhaps the most vivid impression of the extreme luxuriance of the fauna of the Kyle Scotnish narrows is to be gained by working along the S.E. bank on a calm day when the water is clear. The clearness of the water varies greatly. The explanation I at first imagined to lie in the variation in the amount of solid matter in suspension derived from the land. On noticing, however, that the variations in transparency did not agree with the variations in rainfall I looked into the matter more closely and found an important factor to be the number of flagellate organisms present in the water. Three species of Dinoflagellates I have found common in the loch (*Ceratium tripos*, *C. fusus*, and *C. furca*), and the last two frequently occur in prodigious numbers so as to cause a very marked diminution in the transparency of the water.

The eastern bank of the narrows is composed partly of a vertical wall of rock, while towards the N.E. end it assumes the form already mentioned as typical of the N.W. escarpments, *i.e.*, it is littered with detached rocky fragments. The interstices among these fragments are richly populated with animals. The extraordinary Polychaete *Chaetopterus* occurs frequently in its U-shaped tube, and specimens kept alive until dark may be made to demonstrate their wonderful light-producing power. Lobsters are not very abundant in the loch, but in September, 1910, I was able to fish one up, which, some time afterwards, when most of the blood had drained out of it, weighed 7 lbs. 2 oz.

On the rocky walls many other interesting creatures are to be found. Huge *Doris* of orange-yellow colour, and measuring 3 to 4 inches in length are common. They are to be found breeding

about Easter. Another conspicuous nudibranch is the charming Aeolid *Facelina drummondi* with its exquisite colouring, which has, unfortunately, up to the present, baffled all attempts to preserve it unfaded.

Fine specimens of *Echinus esculentus* are to be seen clambering up the rocky walls, also *Ophiothrix fragilis*, while its relative *Ophiocoma nigra* is to be seen in enormous numbers dotted about over the bottom of the channel in places where it is muddy.

Coelenterates are both abundant and interesting; a great variety of Hydroids, groups of the anemone *Actinoloba dianthus* here usually of a rich reddish-orange colour, and in the deeper water small colonies of *Alcyonium* are conspicuous inhabitants of the narrows. Perhaps the coelenterate of most general interest is *Aurelia aurita*, for the Kyle Scotnish narrows are one of the best localities known to me for the fixed larval stage of this jelly-fish, the little Hydra-like creature once mistaken for a species of *Hydra* (*H. tuba*), and which was so well described long ago by that great Scottish naturalist Sir John Graham Dalyell. *Aurelia* breeds in Loch Sween in the early summer, and about the end of June is to be found carrying about its embryos in the edges of the manubrium as described by Minchin. In August the larvae are to be found in enormous numbers dotted about on the surface of the fronds of *Laminaria saccharina* in the narrows. These greyish-white Scyphistomas are very conspicuous on the Laminarian fronds, and any number can be collected with the greatest ease by hooking up the Laminarians from a few feet below low-water mark. As is well known the Scyphistomas live readily in aquariums, and can be kept alive for at least two or three years. Normally, however, they undergo segmentation during the winter, each individual breaking up into a number of Ephyrae—the youngest medusoid stage of the Aurelia. At Loch Sween the normal time for this to take place is apparently about the month of November. By January the scyphistomas have disappeared from the Laminarians, while the plankton contains vast numbers of Ephyrae and young Aurelias up to about 10 mm. in diameter. At Easter the Aurelias have reached a diameter of about 3 inches, though some much smaller are to be found, and even a few Ephyrae. About midsummer sexual

maturity is reached, and breeding takes place, while by August the Aurelias have mostly disappeared. On into the month of August individuals occur, but they become less and less frequent. They show senile decay, they are sluggish, the umbrella is frequently torn, and the milky opacity appearing in the tissues betokens approaching death.

The references I have made to *Aurelia* naturally lead up to a consideration of one of the most interesting sections of the fauna —the plankton or drifting fauna. This is extremely luxuriant, and, as already indicated, it is practicable to work the tow-net in almost any weather. Owing to the high tilt of the cleavage planes of the rocks, springs and streams are comparatively few, and the volume of fresh water discharged into the loch is, except after heavy rains, almost insignificant. The result is that the loch is filled with nearly pure ocean water of a specific gravity of 1·025 to 1·026.* It is only after heavy rains that the specific gravity of the surface layer undergoes any considerable diminution. Such rains commonly also cause a considerable lowering of temperature. During the autumn the temperature of Loch Sween is relatively high, *e.g.*, during August, 1911, it averaged about 16° at the surface, and in September about 15°. The average temperature at the bottom of the upper parts of the loch did not differ on the average markedly from that at the surface, though off course it did not show the same diurnal variation correlated with the temperature of the air. In the deep water of the main channel one finds the colder ocean water. Plankton at the surface is naturally most abundant in absolute calms. On a perfectly calm sunny day the water scintillates with tiny sparkles of light due mainly to reflection of the sunlight from the surface of individuals of *Evadne nordmanni*, which have got caught in the surface film, and from the flinty skeletons of Dinoflagellates and Diatoms just below the surface. The slightest breeze causes the more sensitive plankton organisms to sink downwards, but even when a strong wind is blowing they can usually be found by submerging the tow-net a fathom or two beneath the surface.

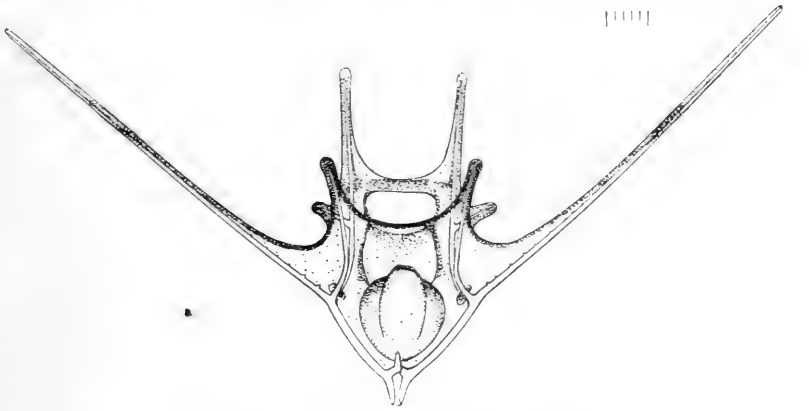
* I am indebted to the Carnegie Trustees for the apparatus used in making physical observations on the water of Loch Sween. I am also indebted to Mr. J. Y. Buchanan, F.R.S., for kindly sending me instructions as to methods of determining densities.

Amongst the autumn Plankton, perhaps the most interesting organisms are the larval forms, which are to be found in Loch Sween in wonderful variety, and pre-eminent amongst them are the various larvae belonging to the phylum Echinodermata, of which I will proceed to mention the more characteristic.

The beautiful larva of *Synapta* (Plate III., figs. 1 and 2), occurs frequently. In the "Nordisches Plankton" (1901) it is stated curiously enough that the larva of *Synapta* had so far been recorded only from the Mediterranean. I say curiously, for I do not remember missing it any year from my autumn tow-nettings off the west coast of Scotland. It does not, in my experience, occur in great swarms like most of the other Echinoderm larvae, but in almost every tow-netting during the autumn one comes across specimens. I give figures (by Mr. A. K. Maxwell), of two preparations in the laboratory which I made from Loch Sween specimens. Of Asteroids, the Bipinnaria larvae are frequent, though they also, like the Auricularia of *Synapta*, do not normally occur in swarms.

Of Echinoids, the Echinoplutei of *E. esculentus* and *E. miliaris* abound, while the magnificent larva of *Echinocardium cordatum* is very common, though not so numerous in individuals as the two species of Echinus. In mere numbers the Ophioplutei far exceed any of the other Echinoderm larvae, as indeed might be expected from the numbers of adult Ophuiroids. The common Ophiuroids are (1) *Ophiothrix fragilis*; (2) *Ophiocoma nigra*; (3) *Ophiura albida*; (4) *O. ciliaris*; and (5) *Amphiura chiaji*. Of these, (1) and (2) occur in enormous numbers; (3) is not so abundant, but still numerous; while (4) and (5) are again less abundant than (3). We should expect to find the numbers of larvae to bear a rough proportion to the numbers of adults, but, unfortunately, it is not possible in the present state of our knowledge to identify all the larva with certainty. It is greatly to be desired that the eggs of our various local species of Ophiuroids should be reared up to the typical larval stage to settle definitely the question of the identity of the various larvae. The task has been rendered a much easier one than it would have been a few years since by the elaboration, by Dr. Allen of the Plymouth laboratory, of methods for rearing pure cultures of the various necessary food organisms. The work could easily be done at the Millport laboratory.

In the meantime I give figures of the various common Ophioplutei of Loch Sween. One of the most certainly identified



Text-Fig. 1.—Larva of *Ophiothrix fragilis*.

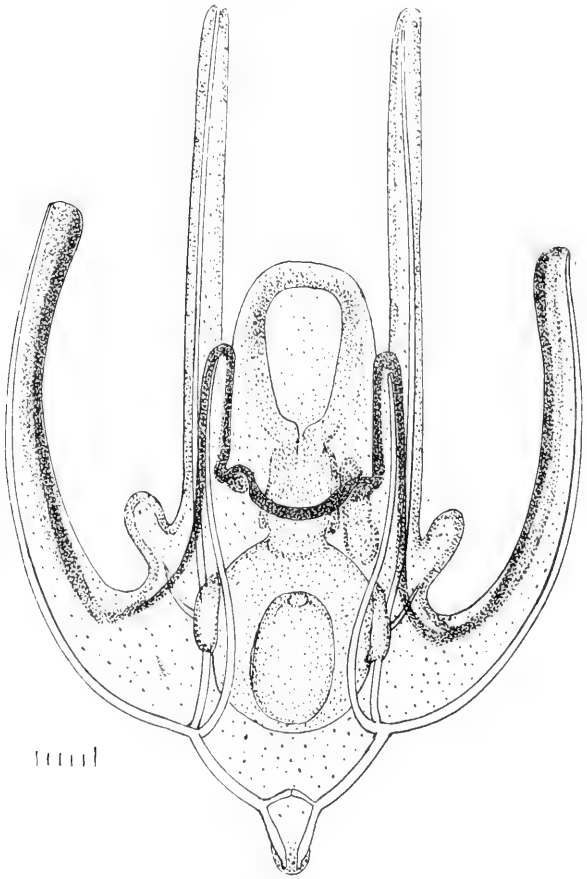
Ophioplutei is that of *O. fragilis* (*A*) characterised by its very long straight postero-lateral arms. It occurs in immense swarms in September in Loch Sween.

(*B*) The larva of *Ophiura albida* is again a well defined form, characterised by its thick curved postero-lateral arms, by the sharp angle between the skeletal rod belonging to the postero-lateral arm and that which runs along the margin of the body, and by the cap of ciliated cells covering the apex of the body. There remain two very common ophioplutei, which I shall designate as C. and D.

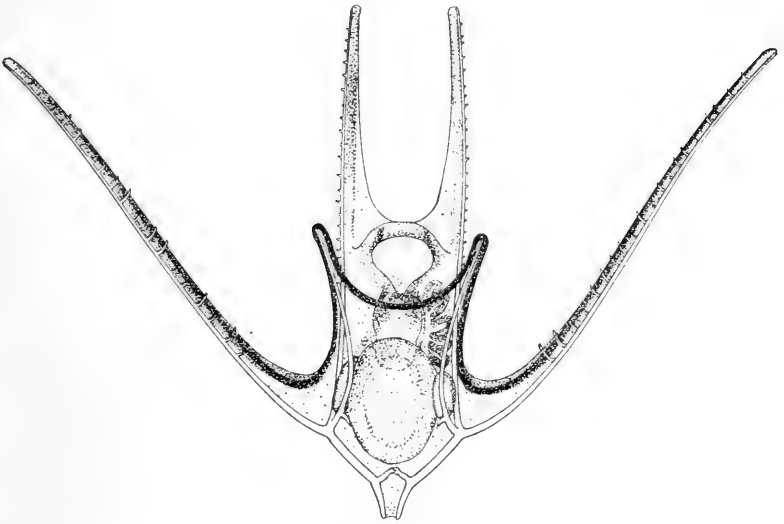
(*C*) is a larva which approaches most near to *Ophiopluteus mancus* of Mortensen. It was common both as a larva and in process of metamorphoses (see plate I., fig. 3), during September in 1911, and is characterised by its slender gracefully curved postero-lateral arms with bright orange tips. The inner side of the skeletal rod which supports these arms is beset with large hook-like projections. Mortensen suggests that his *O. mancus* may be the larva of *Amphiura filiformis*, and, if this is correct, we may suspect the larva under consideration to belong to *A. chiaji*.

(*D*) There remains one Ophiopluteus which occurs in immense numbers. In the early part of August, 1911, it was the predominant type—and one is tempted to suspect that it belongs to *Ophiocoma*. The general appearance is shown in the figure. The postero-lateral arms, curved inwards as in the larva of *Ophiura albida*,

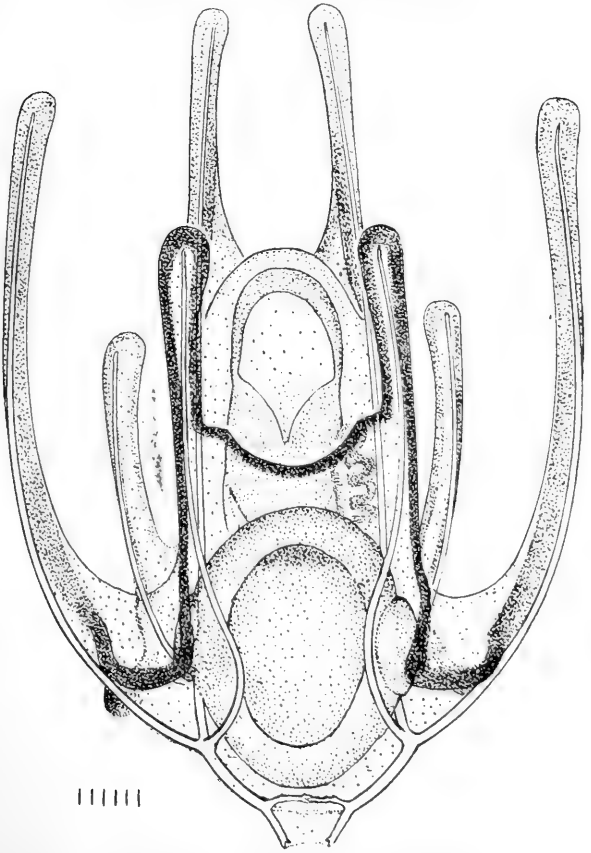
give a characteristic shape. The most conspicuous peculiarity however, consists in the fact that the ciliated band at the base of the postero-lateral arms becomes in the fully developed larva thickened, and bulges out to form an "epaulette" which is a conspicuous feature in the living larva. There are four of these epaulettes as they occur both dorsally and ventrally. Mortensen, in his "Echinoderm-larvae of the Plankton Expedition," mentions only one Ophiuroid larva known to him (his *O. henseni*) to possess epaulettes, but the figure he gives differs markedly from the Ophiopluteus now under consideratian. This latter is further characterised by the ends of the arms becoming somewhat club-shaped in the fully developed larva.



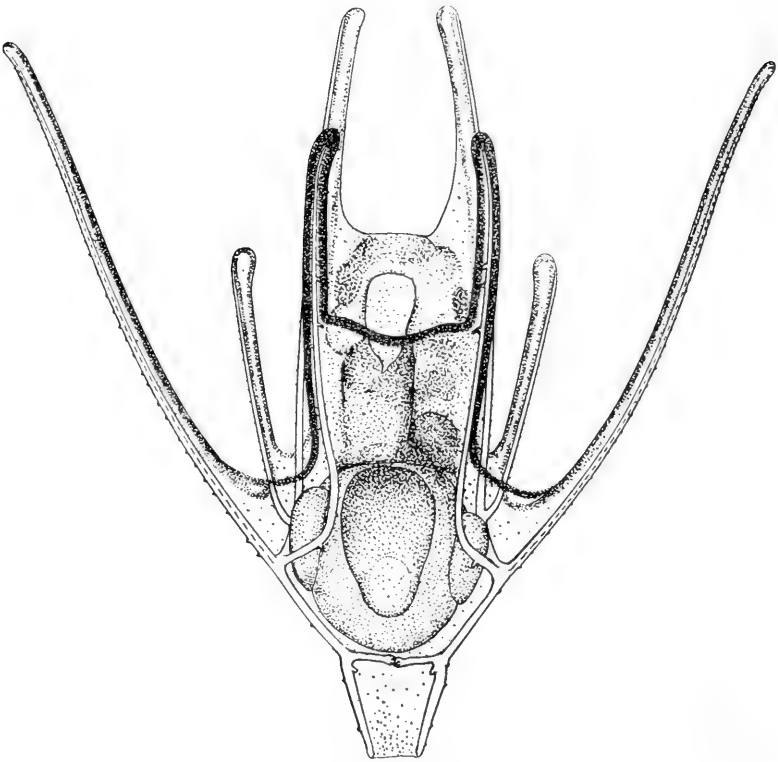
Text-Fig. 2.—Larva of *Ophiura albida*.



Text-Fig. 3.—Ophiopluteus of Type *C*.



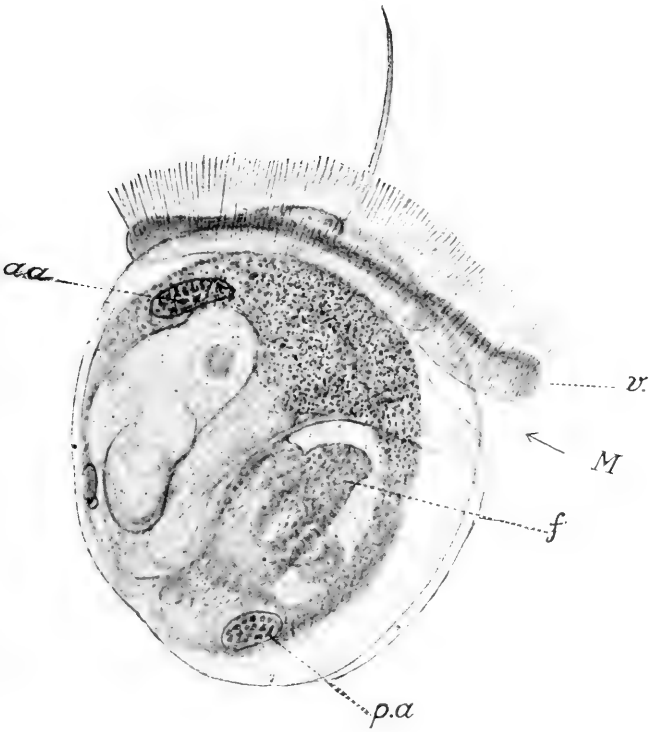
Text-Fig. 4.—Ophiopluteus of Type *D*.



Text-Fig. 5.—Larva of *Ophiura ciliaris*.

(*E*) The last and least numerous of the five ophioplutei which I have found most frequent in Loch Sween, is the larva of *Ophiura ciliaris* which can be recognised easily by the skeletal rod of the postero-lateral arm being perforated along its centre by wide slits so as to economise material and save weight.

A number of the most conspicuous larval forms of the Loch Sween plankton belong to the phylum Mollusca, and here again we are confronted with the great need of more definite information as to the species to which particular larval forms belong. The autumn plankton contains myriads of larvae of Pelecypoda and Gastropoda. I give figures of three of the more interesting of these.



Text-Fig. 6.

Plate IV., fig. 1 and Text-fig 6, represent larvae which occur in immense numbers, and therefore probably belong to some common forms such as *Mactra* or *Mya*. Both figures are taken from Canada balsam preparations which I have added to the University collection. The specimen shown in Plate IV., fig. 1, is interesting from the excellent view it affords of the general structure of a Pelecypodan larva.

The other larva figure Plate IV., fig. 2, is that of a Gastropod, recalling that of *Aegirus*, with a magnificent velum. It frequently is conspicuous in the autumn plankton of Loch Sween.

Of the other great groups I have space to say only a few words. Amongst the Protozoa perhaps the most interesting form is the Silicoflagellate *Distephanus speculum*, which is, from the appearance of its silicious skeleton, usually mistaken for a radiolarian. In Loch Sween it occurs commonly in the "houses" of *Oikopleura*. Of Coelenterates there is a great variety of Medusae. 1911 was a Cyanea year, this medusa (*C. capillata*) occurring in great numbers in the loch. *Rhizostoma octopus* also occurred, but was more frequently to be seen forging its way along in the Sound of Jura. *Aurelia aurita* abounds every season in the loch, and on a calm day, about Easter, the water's surface has sometimes an appearance as if a heavy shower of rain were falling on it, each break in the surface film being caused by the butting against it of an Aurelia. Of the smaller Medusae, *Tiara pileata*, *Slabberia* Sp. (probably *S. catenata*), *Obelia*, *Phialidium* abound. Occasional specimens turn up of that extraordinarily active medusa *Cladonema radiatum*, which darts about in the water with most unmedusa-like rapidity, pausing every now and then resting on its tentacles. Of Ctenophores, in addition to the common Pleurobrachia, there are sometimes numbers of small lobate forms (*Ocyroe* Sp.), surely among the most exquisitely beautiful of all marine organisms. Annelidan larvae are frequent—the remarkable larva of *Chaetopterus* being one of the most striking. I have not so far found the trochosphere of *Polygordius* in Loch Sween. The mature males and females of *Autolytus* are frequent during autumn in the surface plankton. The male swims with great rapidity, and when it seizes the female the two whirl round at a rate at which the eye completely fails to follow them. Of other worm larva, Pilidium occurs as occasional specimens, while the Actinotrocha larva of *Phoronis* is often abundant. A really rich haul of Loch Sween autumn plankton when viewed under the binocular with Actinotrochas jostling about amongst myriads of Ophioplutei, Echinoplutei, Cyphonautes, Veligers, Balanid nauplii, Copepods, Cladocera,* forms a most striking spectacle. Of Crustacea larvae, Balanid nauplii and Cyprid stages abound, and it is an interesting sight to watch them at the time when they

* *Evadne nordmanni* and *Podon polyphemoides* are the commonest.

are ready to metamorphose. At this time the cement glands of the first antennae become functional, and the larva, moving along in contact with a solid surface, takes, as it were, steps with its now sticky antennae, presenting a ludicrous resemblance to a person trying to walk along very adhesive mud. Each time that the antenna sticks the larva makes violent efforts to free itself, but eventually its efforts are no longer effectual, and it remains fixed—doomed to undergo metamorphosis, and remain sessile for the rest of its life. Besides the ordinary Decapod larvae, one finds every now and then in the tow-net the remarkable Trachelifer larva of *Jaxea*. To come lastly to the Chordata, one finds *Oikopleura dioica* in enormous numbers all the year round, its gelatinous house forming a useful trap for what Lohmann calls the *Nannoplankton*, *i.e.*, the extremely minute plankton organisms such as the Silicoflagellates already alluded to. *Fritillaria* occurs occasionally as isolated individuals, but I have never found it numerous. Of the fixed Tunicates one finds Tadpole larvae frequent during the autumn, while floating eggs I have found commoner in winter.

I have now come to the end of this too long and yet too brief sketch of the Zoology of Loch Sween. I have alluded only to the aquatic animals, but it must not be imagined that the district is an uninteresting one to the naturalist who is concerned rather with nonaquatic form. On the contrary, the country adjoining the loch, more especially the parts clothed in dense woodland, is haunted by a luxuriant fauna, and the observer interested in insects, birds, or mammals, will find ample scope for his activities. It is, however, for marine investigation that Loch Sween affords pre-eminent opportunities, and I venture to indulge in the hope that some day we shall see established upon its shores a small permanent research laboratory. Such a laboratory even on the humblest and least pretentious scale would, in the hands of a competent director, be most attractive to the zoological investigator, and might well be expected to play an important part in furthering the cause of Scottish Marine Biology.

DESCRIPTION OF PLATES III. AND IV.

PLATE III.—YOUNG ECHINODERMS FROM LOCH SWEEN.

Fig. 1. Auricularia larva of *Synapta*, seen from ventral side. Fig. 2. Ditto, seen from right side. Fig. 3. Metamorphosing Ophiuroid.

a. Anus; *h.* Hydrocoele; *l.p.c.* Left posterior coelome; *m.* Mouth; *n.s.* Larval nervous system; *oes.* Oesophagus; *os.* Ossicle; *r.p.c.* Right posterior coelome; *st.* Stomach; *w.p.* water pore.

The Scale marks hundredths of a millimetre.

PLATE IV.—MOLLUSCAN LARVAE FROM LOCH SWEEN.

1. Pelecypodan larva. 2. Gastropod larva.

a.a. Anterior adductor muscle; *ap.* apical nervous thickening of ectoderm; *int.* Intestine; *l.* Left "Liver"; *M.* Mouth; *ot.* Otocysts; *p.a.* Posterior adductor; *r.m.* Retractor muscles of velum; *st.* Stomach; *v.* velum.

The Scale marks hundredths of a millimetre.

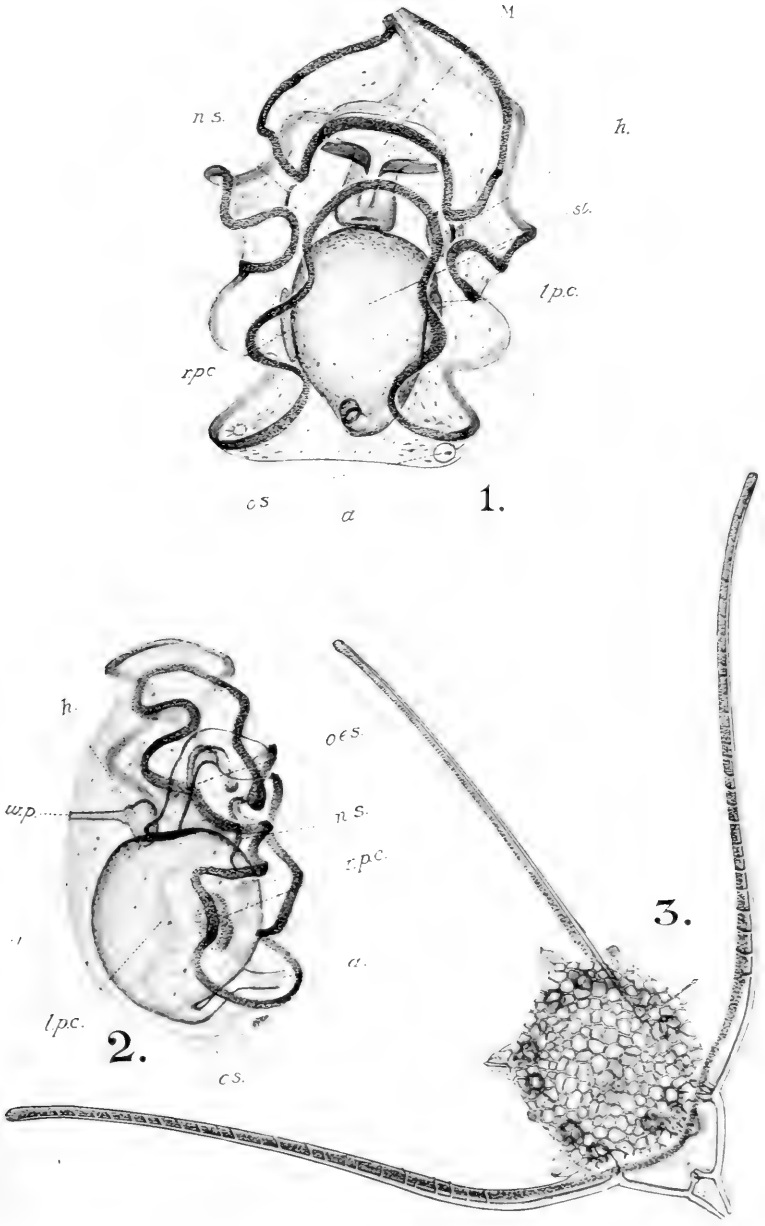
The Summit-Flora of the Breadalbane Range.

By PETER EWING, F.L.S.

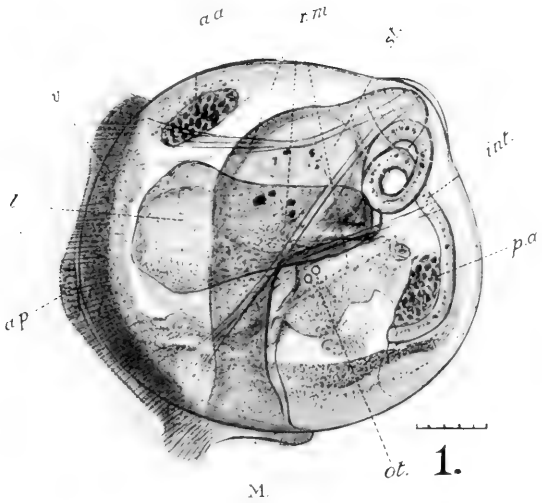
[Read 30th January, 1912.]

In connection with my studies relating to the immigration of plants, I have made notes of the flora of many of our Aberdeenshire, Forfarshire, and Perthshire mountains; but for my present purpose I will confine myself specially to six mountains forming part of the Breadalbane range, as most of the papers I have read before this Society relate to that region.

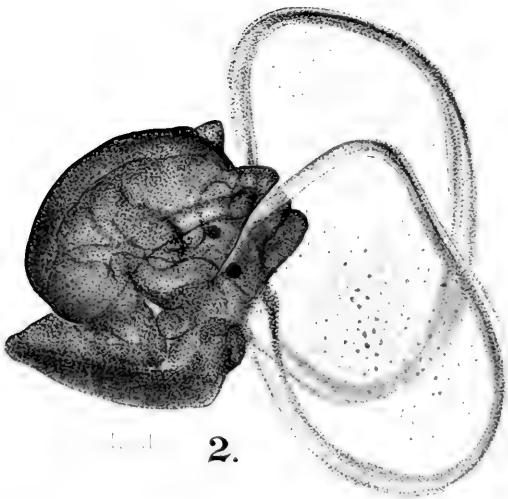
To judge from the series of papers by F. N. Williams, F.L.S., which appeared in the *Annals of Scottish Natural History*, 1908-1909, very little really trustworthy information is to be found in books regarding the plants growing at high altitudes in Scotland. I do not forget what appears in the "Perthshire Flora," being myself responsible for many of the records there given. The practice then was to note the highest altitude at which a plant was seen, whether in flower or not, if there was no possibility of misnaming it. F. B. White carried an aneroid with such a large scale that a rise or fall of ten feet could be detected; and during his later years he collected nothing except critical plants, only visiting the stations for plants and noting



YOUNG ECHINODERMS FROM LOCH SWEEN.



1.



2.

MOLLUSCAN LARVAE FROM LOCH SWEEN.

the altitudes for himself, so that the altitudes given by him are quite trustworthy. At the same time these are not the altitudes at which the plants grow and reproduce themselves; rather they are often places where seeds have been transported by the wind or other agency and have developed. Such is the case with *Myosotis alpestris*, the highest altitude for which is the Ordnance Ravine, Ben Lawers, where in some years you will find plants about one inch high and able to carry one to three flowers.

I have never been in favour of giving altitudes for our alpine plants, as that practice has only facilitated clearing them off, and in a very few years will lead to the extermination of all our rarer alpine species; nor is that my intention now, although some of them will inevitably come under notice.

I should have preferred to follow the metric system with reference to altitudes, but I consider that to be a failure so far as the papers above referred to are concerned. Mr. Williams's 1,000 metres, judging by the plants noted, are only equal to 3,000 feet, and in some cases lower. The same remark applies to his summits, as in the case of *Hieracium alpinum*, the first plant he mentions. He gives the summit of Ben Lawers for it; but very probably this means about 2,750 feet on Meall Garbh, where there is a fair quantity of it even yet. It does occur on the middle patch of rocks above Lochan nan Cat at nearly 3,000 feet, but on rather inaccessible ledges, and only very sparingly. I prefer therefore to adhere to feet, as in that case we have the Ordnance Survey Map to guide us, and with a little practice are able to tell the altitude with the map alone, although this is quite impossible in misty weather. I will only refer to plants found above 3,250 feet (which is 30 feet lower than the 1,000 metres), and this contour line is shown on the 1-inch scale maps. To drop to 3,000 feet would have included a few of our rarer alpines which are better left out.

Perhaps it would not be out of place at this point to make some remarks on the conditions under which plants grow at high altitudes, as it is quite apparent that elevation has very little to do with their existence. As a proof of this I may say that I have *Lychnis dioica* growing at Uddingston at 100 feet above sea-level just as I found it at 6,700 feet on the Dovrefjeld in Norway; the flowers are certainly lighter in colour, but that is

all the apparent difference. It would be useless to discuss our mountain vegetation in the way used in connection with continental floras, as we lack the tracts of high mountainous regions to form floral zones. As we ascend, a change in the flora is observable, but it is much mixed and very gradual. Still our plants are subject to the same natural conditions as those of higher mountains, although in a lesser degree.

As nothing is of more importance to plant life than water, its action on the following plants (the majority of which grow above the influence of standing water or stream, and are dependent on rains and mist) demands our first consideration. Upon the results of climate and nidus depends the circulation of the cell sap, therefore conditions must vary greatly at high elevations. Like the plants of the low country, the plants now considered are hygrophytic and xerophytic, ombrophobous and ombrophilous, to suit the conditions in which they are placed. By the side of a mountain stream, I have seen *Caltha palustris* and *Phleum alpinum* growing equally well together on the bank or in the stream; and *Caltha minor*, from a height of over 3,000 feet, became in three years at Uddingston as large as *Caltha palustris* by the side of the River Clyde. *Cochlearia officinalis* is always larger on the rock-ledges than it is on the detritus or by the streams; and the same may be said of *Alchemilla vulgaris* and many others. Few of our alpine plants are hydrophytes. Carices look well when growing under aquatic conditions, but their reproductive power seems to be poor; *Festuca rubra* with smooth glumes, and *F. barbata* with pubescent, do not seem to be affected by nidus wet or dry. The viviparous state in some plants also requires more study. It is not due to altitude. *Polygonum viviparum* is more viviparous under cultivation and less viviparous as it ascends; *Poa alpina* var. *vivipara* is rare on the Dovrefjeld in Norway, while it is by far the most common state with us; *Deschampsia cæspitosa* seems to get more viviparous as it ascends, whereas *Festuca ovina* var. *capillata* seems more viviparous on the wall-tops than it is on the mountains.

Much that is written about the modification of leaves, to enable plants to exist on wet, or dry and exposed, situations, is hard to understand. Some plants do exist on dry wind-swept ridges, but they seem to be driven to these positions and maintain their

footing there by their habit of growth; such are *Loiseleuria procumbens* and *Potentilla Sibbaldi*, as well as some narrow and recurved and narrow-leaved plants, which retain these same peculiarities when grown in sheltered places. *Hieracium holosericeum* is also a ridge plant, but except for being smaller in all its parts does not otherwise differ from the ledge-growing plant.

It is apparent that leaf formation and hairs have to do with transpiration more than with the water supply, if not altogether connected with the former function; but the use of hairs on plants is a difficult problem, although often a good guide to the systematist, enabling him to distinguish one form from another. In *Cerastium alpinum*, the forms with woolly and glabrous leaves grow side by side; *C. arcticum*, which I have seen at 7,000 feet, is the most glabrous of the three; and all are ridge-plants. The woolly and glabrous leaved Hieracia grow on the same rock-ledge. *Alchemilla vulgaris* var. *alpestris* has the largest and smoothest leaves of any member of the species: a typically hygrophilous plant with ombrophobous foliage. The succulent leaves of such plants as *Oxyria digyna* might be supposed to serve the same purpose as hairs, but the wetter the situation the thicker do the leaves become; while with *Rumex Acetosella* the leaves, instead of becoming thicker, are filiform. The majority of the plants we are now discussing must be xerophytic during winter while covered with snow; and on the ridges, although wet and exposed to the light, the temperature during these open winters should be low enough to produce the same result. The disappearance of so many of our ridge-plants, however, makes this very doubtful.

We have practically no aquatic plants at over 3,250 feet —in fact, at a much lower altitude the boundary line has gone. Many plants we see growing on walls at a low elevation, such as *Cochlearia*, *Cardamine* and *Epilobium*, take to the streams and marshes at high elevations, the foliage and the fruit, no doubt, suffering by the change; and we see the same result in many of the mosses and hepatics, if growing in constant water. *Bryum* seldom or never fruits in the marsh. *Hypnum arcticum*, and the common mountain hepatic *Jungermannia cordifolia*, if constantly wet or constantly dry, do not form fruit; while, if

on a rock in a stream, where they are often wet and often dry, they fruit freely, thus showing that the passage from wet to dry growing is possible.

Temperature is perhaps the next most important thing to consider regarding these plants, but again we are met with many difficulties. There must be a point both above and below 32° at which the organs of plants cease to perform their functions, and this point must often be met with under natural conditions. Experience shows that growth has not a wide range, and it also shows that the destruction of the organs must, on the contrary, have a very wide range. Every alpine botanist has experienced the great range of temperatures in one day on the mountains. In July I have seen the fields covered with hoar-frost at Killin. Blinding hail and snow showers are frequent during July on the heights, and after the sun has dispelled them vegetation seems none the worse. We also know for a fact that vegetation at 2,500 feet is covered with hoar-frost every clear night during the growing season; here it is apparent that the cold must have a very drying effect on the plants, and drive the water out of the cells, thereby preventing rupture by the formation of icicles in them; yet there is nothing so detrimental to plants, either at high or low elevations, as a dry east wind. According to Kjellman, *Cochlearia fenestrata*, growing in the Arctic regions, was arrested in the midst of its flowering season by snow; and the following season, after the snow had melted, it just began growth again where it had left off the previous season. This is certainly not the case with our alpine plants. On Ben Lawers and Ben More I have known snow to lie for a whole season, and on Beinn Heasgarnich for two seasons, and at the head of Canlochan for more than two seasons, and on all these places I have seen the snow absent for two or more succeeding seasons, without any apparent change in the flora. *Cerastium alpinum*, *C. triviale*, *Galium saxatile*, *Nardus stricta*, *Festuca ovina*, and some of the alpine mosses and hepatics, do not seem to be affected by a covering of snow for two or three years; yet *Sagina nivalis* was killed out of the original station, where Balfour found it in 1847, by a covering of snow during only one summer. *Loiseleuria procumbens*, *Saxifraga oppositifolia*, and *Caltha palustris*, will flower although partially covered with snow, but

it is quite apparent that the clearing of the snow off the ridges during these mild winters (thus allowing the cold east winds to get too early at the plants, and thereby extracting their moisture) is the cause of the extermination of many of our ridge-plants.

The records from the meteorological stations at Fort-William and the summit of Ben Nevis in July are interesting. For the former, mean 45·6°, mean daily max. 30·9°, min. 41·6°, mean monthly max. 57·0°, min. 36·3°; and for the latter, mean 36·5°, mean daily max. 38·4°, min. 34·5°, mean monthly max. 45·3°, min. 30·1°. The following notes, selected from many years' observations made during July of each year (the best growing month for plants on the range), will give an idea of the fluctuation of temperatures, and the conditions under which plants grow on the summits. These notes were made for another purpose. Meal Ghaordie, at about 3,000 feet, noon, in sunshine, temperature in the space between the soil and a snow patch about 20 inches back from the face 40°; same thermometer lying on the snow 38°; in the snow 32°; 6 feet above, and in the wind blowing across the snow, 48°. *Nardus stricta* and *Festuca ovina* had either been growing under the snow or had been arrested in their growth, and were etiolated as if they had been growing in the dark. *Saxifraga stellaris* was quite green in the water at 33°, and the same plant was flowering in water at 34°. On the summit (3,407 feet) at 1.30 p.m. the air in the sun was 45°; at 1.50 p.m. a shower of snow passed over, and the thermometer still hanging on my alpenstock fell to 28°. In the following, which are given at random, "air" means about 6 feet above the ground, and "soil" or "water" means about 6 inches below the surface. Ben Lawers at 3,000 feet, 4 p.m., under cloud—air 50°, bog 58°; Can Chreag at 3,000 feet in sun—air 50°, in wet-growing sphnagnum 48°; same mountain at 2,500 feet under cloud—air 42°, water 48°, soil 44°. Ben Lawers in sun at 3,000 feet—air 66°, water 74°, soil 64°. The water in this case contained growing plants. Saddle back between Beinn Laoigh and Beinn Oss—air 52°, soil 58°, water 68°. The year 1911 will long be held in memory as an exceptional one, and very trying for our alpine plants. On Beinn Laoigh this year (10th July) at 4.30 p.m. altitude 3,708 feet — in sun, air 66°, soil 60°, and under all roots 58°, lying on a rock 90°. On Ben More (13th July) 3,843 feet, 3.30 p.m.—air 70°, soil 58°, lying on a

rock 98°. This is the first year in all my experience in which I found the air so much warmer in the sun than the soil. The difference between sunshine and cloud on summits varies from 10° to 30°.

Light must also be an important factor in the life of these plants. We know that the photometric power of light is very strong on alpine heights as we see from the dark coloured foliage and flowers. Whether the light can be so strong as to stop growth is, however, questionable. The more rarefied air seems to allow the plants to develop more quickly, and there is no doubt that in seasons with little rain or mist the plants are sooner past flower, and in many places where the plants are shaded in the crevices, they seem as far advanced as those exposed. It is also worthy of note that *Gentiana nivalis* only opens its flowers in sunshine, and all plants droop in mist, showing that water leaves the cells instead of distending them under these conditions.

Another point worth considering is atmospheric pressure, which likewise must exert a great influence on these plants. The mists and strong winds must carry along with them a great excess of oxygen, causing rapidity of growth and large leaves and flowers, as seen in such plants as *Viola amoena* on the cliffs of Ben Lawers; moreover the water they get being so much aerated is the cause of their long and delicate roots, and also explains the absence of plants with bulbous roots or thickened rootstalks.

Wind no doubt is the most serious factor which these plants have to contend with at such high elevations. A dead calm may exist on the plain, but seldom or never at 3,000 feet, which no doubt accounts for the anemophilous flora predominating, such as Carices, Junci and Grasses.

The soil may appear peaty, but it is covered with plants which find their wants supplied. The rocks themselves are for the most part schists rich in calcium, magnesium and potassium; and although it appears to me that the phylite schists do not play the important part assigned to them by Mr. P. Macnair in his *Geology of the Grampians*, yet their foliate nature where they exist makes a very suitable nidus for our alpine plants. We are of course dealing with the detritus or debris of these schists in most cases. But all rocks are said to contain calcium carbonate,

although this must be present only in small quantities, as *Lychnis dioica*, *Blechnum Spicant* and *Cryptogramme crispa* are common on the detritus and ledges along with other chomophytes; *Bryum alpinum* is also frequent all over the district, but only fruits when the substratum is calcareous; acid, too, is present as shown by its action on the skin when working among the soil. Yet the question of soil is not so important at 3,250 feet as is that as to where the organic substances come from by which the plants are built up. That the wind does carry vegetable and mineral matter all over these heights there is no doubt. I found a large leaf of *Alnus glutinosa* on Ben Lawers in 1911, which must have been carried up at least 3,000 feet. Then the snow patches show the great amount of dust continually blowing about, composed of sand and vegetable matter, the latter mostly cryptogamic. If the higher orders of plants cannot reduce the carbon and nitrogen in this dust into a state fit for assimilation, we know that some of the lower orders can, and we fall back on bacterial action to provide a suitable humus for the others. In the moist, higher, sheltered crevices the plants seem to depend on the wind for supplying carbon dioxide, the nitrates being washed down from the decomposing rocks and plants above.

What then are the common plants of our summits? I will take up six well-known mountains, and from above 3,250 feet, on which I find 113 species (marked with an x in the following Table), arranged into 74 genera, under 36 natural orders, which of course is raising, in some cases, what are generally known as varieties to the rank of species.

Natural Orders of Plants and Number of Species.

1. Ranunculeae 3.	13. Rubiaceae 2.	25. Euphorbiaceae 1.
2. Cruciferae 8.	14. Asteraceae 7.	26. Salicaceae 3.
3. Violaceae 3.	15. Campanulaceae 1.	27. Juncaceae 5.
4. Caryophyllaceae 9.	16. Vacciniaceae 1.	28. Typhaceae 1.
5. Portulacaceae 1.	17. Ericaceae 1.	29. Naiadaceae 1.
6. Geraniaceae 2.	18. Plumbaginaceae 1.	30. Cyperaceae 6.
7. Rosaceae 5.	19. Gentianaceae 1.	31. Graminaceae 12.
8. Saxifragaceae 8.	20. Boraginaceae 1.	32. Equisetaceae 1.
9. Crassulaceae 2.	21. Scrophulariaceae 5.	33. Polypodiaceae 8.
10. Haloragaceae 1.	22. Lentibulariaceae 1.	34. Ophioglossaceae 1.
11. Epilobiaceae 2.	23. Lamiaceae 1.	35. Lycopodiaceae 2.
12. Caprifoliaceae 1.	24. Polygonaceae 4.	36. Selaginellaceae 1.

GENERA AND SPECIES.

P. = Flora of Perthshire. S. = Own Records.

	Ben Lawers, 3,984 ft.	Meal nan Tarmachan, 3,421 ft.	Beinn Heasgarnich, 3,530 ft.	Creag Mohr, 3,887 ft.	Beinn Laoigh, 3,708 ft.	Ben More, 3,843 ft.
P. Thalictrum alpinum L., -	x	x		x	x	x
P. Ranunculus acris L., -	x		x		x	x
P. Caltha minor DC., - -	x		x			
S. Arabis petræa Lam., -					x	
S. Erophila verna (L.) Meyer,	x					
P. Cardamine flexuosa With.,	x					
P. ,, hirsuta L., -	x					
P. Drapa rupestris Br., -	x	x				x
,, incana L., - -	x		x			
P. Cochlearia alpina Sweet, -	x	x			x	
P. ,, groenlandica L.,						
P. Viola palustris L., - -			x	x	x	
P. ,, sylvatica Fr., -	x					
P. ,, amoena Syme., -	x					
P. Silene acaulis L., - -	x	x	x	x	x	
P. Cerastium vulgatum L., -	x	x				
P. ,, alpinum L., -	x	x	x	x	x	
S. Stellaria uliginosa Murray,	x					
P. Arenaria rubella Hook., -		x				
P. ,, Sedoides Kittel,	x	x	x	x	x	
P. Sagina nivalis Fr., - -	x	x				
P. ,, saginoides Dalla Torre,	x				x	x
P. ,, procumbens L., -	x	x	x		x	
S. Montia fontana L., - -		x				
S. Geranium sylvaticum L., -					x	
P. Oxalis Acetosella L., -	x			x	x	
S. Potentilla erecta Hampe, -	x			x	x	
P. ,, Crantzii Beck, -	x					
P. ,, Sibbaldi Hall., -	x	x	x	x	x	x
P. Alchemilla vulgaris L., -		x				

	Lawers.	Tarmachan.	Heasgarnich.	Creag Mhor.	Laoigh.	Ben More.
P. Alchemilla alpina L., -	x	x	x	x	x	x
P. Saxifraga aizoides L., -	x		x			
P. ,, oppositifolia L.,	x	x				
P. ,, hypnoides L., -	x	x	x			
P. ,, cernua L., -	x					
P. ,, rivularis L., -	x					
P. ,, nivalis L., -	x	x	x		x	
P. ,, stellaris L., -	x	x	x	x	x	x
P. Chrysosplenium oppositifolium L., - - -	x		x			
P. Sedum roseum Scop., -	x	x			x	
P. ,, villosum L., - -	x					
S. Callitriche angustifolia Hoppe., - - -	x					
P. Epilobium alsinefolium Vill.,						x
P. ,, alpinum L., -	x	x	x	x	x	x
P. Adoxa Moschatellina L., -						
P. Galium boreale L., - -						
P. ,, hercynicum Weig.,	x	x	x	x	x	x
P. Erigeron alpinus L., -	x					
S. Bellis perennis L., - -	x					
P. Gnaphalium supinum L., -	x	x	x	x	x	x
P. Achillea Millefolium L., -			x			
P. Tussilago Farfara L., -	x					
P. Saussurea alpina DC., -	x					
P. Taraxacum palustre DC.,	x				x	
P. Campanula rotundifolia L.,	x	x				
P. Vaccinium Myrtillus L., -	x	x	x	x	x	x
P. Pyrola minor L., - -						
P. Statice maritima Mill., -						
P. Gentiana nivalis L., -						
P. Myosotis pyrenaica Pourret,	x					
P. Veronica alpina L., - -						
P. ,, serpyllifolia L., -	x				x	
P. ,, fruticans Jacq.,	x					

	Lawers.	Tarmachan.	Heasgarnich.	Creag Mhor.	Laoigh.	Ben More.
P. Euphrasia officinalis L., -	x		x	x		
P. Rhinanthus Crista-galli L.,						
P. Utricularia intermedia Hayne, - - -	x					
P. Thymus Serpyllum L., -	x		x		x	
P. Polygonum viviparum L.,	x	x		x	x	
P. Oxyria digyna Hill, -	x	x		x	x	x
P. Rumex Acetosa L., - -	x		x	x	x	
P. ,, Acetosella L., -	x	x		x	x	
P. Mercurialis perennis L., -						
P. Salix lapponum L., - -						
P. ,, herbacea L., - -	x	x	x	x	x	x
P. ,, reticulata L., - -						
P. Juncus squarrosus L., -					x	
P. ,, triglumis L., -	x		x			
S. ,, trifidus L., - -	x				x	
P. Juncoides multiflorus Druce,	x				x	x
P. ,, spicatum L., -	x	x	x	x	x	x
S. Sparganium natans L., -	x					
S. Triglochin palustre L., -	x					
P. Eriophorum angustifolium Roth, - - - -	x					
P. Carex saxatilis L., - -	x		x			
S. ,, Halleri Gunn, -			x			
P. ,, rigida Good., - -	x	x	x	x	x	x
P. ,, echinata Murr., -	x		x			
S. ,, canescens L., - -	x		x			
P. Anthoxanthum odoratum L.,	x		x		x	
P. Phleum alpinum L., -						
P. Agrostis tenuis Sibth., -						
P. Deschampsia caespitosa Beauv., -	x	x	x	x	x	x
S. ,, flexuosa Trin.,	x	x	x	x	x	x
S. Molinia caerulea Moench,					x	
P. Poa alpina L., - -	x			x	x	

	Lawers.	Tarmachan.	Heasgarnich.	Creag Mhor.	Laoigh.	Ben More.
S. Poa glauca Vahl, - -	x					
P. ,, annua L., - - -	x					
P. Festuca rubra L., - -	x					
P. ,, ovina L., - -	x	x	x	x	x	x
S. Nardus stricta L., - -	x	x	x	x	x	x
P. Equisetum arvense L., -	x					
P. Cryptogramme crispa, Br.,					x	
P. Blechnum spicant With.,	x				x	
P. Athyrium alpestre Milde,	x				x	
P. Polystichum Lonchitis Roth, - - - -					x	
S. Dryopteris Filix-mas Schott.,					x	
P. ,, aristata (Vill.),	x	x			x	
P. Cystopteris dentata Hook.,	x	x			x	
P. Phegopteris polypodioides Fée, - - - -					x	
P. Botrychium Lunaria Sw.,						
P. Lycopodium alpinum L., -			x	x	x	x
P. ,, Selago L., -	x	x	x	x	x	
P. Selaginella Selaginoides Link, - - - -						

The list given above shows that our alpine summits are not completely barren, and I have no doubt that a systematic search would enable any one to add to this list, although not so largely as some authorities would lead us to believe. In most alpine lists Asteraceae take first place, next comes Leguminosae, and then Gramineae. In above list one sees a great difference. It will be observed that I have included fourteen species in my list which have no x against them. These are taken from the *Perthshire Flora*, a very reliable source, as I know from experience, having had many a long walk with F. B. White in order to certify other botanists' records as well as my own. On these fourteen plants I offer the following remarks. F. B. White did not know *Cochlearia groenlandica*, and we often spoke of *C. micacea* E.S.

Marshall as the alpine form of *C. danica*. I have only seen them on the detritus below 3,000 feet on Ben Lawers. I have overlooked *Cardamine hirsuta*. *C. flexuosa* is not uncommon. *Adoxa Moschatellina* is common among the boulders in the Western Ravine, Ben Lawers, but not above 3,000 feet. The segments of the leaves are narrow when it is found growing in dry or exposed situations, but not so when among the boulders. As to *Veronica alpina*, I feel confident that this does not occur on any of the mountains here mentioned. This authority gives 3,800 feet, which of course means Ben Lawers; but the dark-flowered *Veronica* which grows near the summit, and is also found near the summit of the spur of Creag Mhor, is a form of *V. serpyllifolia*. I have proved both forms at Uddingston where it grows freely, whereas *V. alpina* will not acclimatize with me. Of *Rhinanthus Crista-galli*, I have seen the common as well as the hairy form at great altitudes on the range, but not at 3,000 feet. As to *Mercurialis perennis*, I have gone over all my Perthshire, Argyllshire, Forfarshire, and Aberdeenshire alpine lists, and I do not see this plant mentioned in one of them above 2,100 feet. *Salix lapponum*—this plant is still in the Eastern Ravine, Ben Lawers; height 2,700. I saw it there last year (1911). *S. reticulata*, said to grow in the Ordnance Ravine, Ben Lawers, I have overlooked, and doubt its ability to stand that exposure. I hope however that someone will record it anew. Of *Phleum alpinum* there are still a few plants on the middle patch of rocks above Lochan nan Cat. In my opinion the upper rocks are too dry for it, in fact one rarely sees it at 3,000 feet in the Canlochan district where it is a common grass. *Galium boreale* goes well up the streams all over the range, but I have no records near 1,000 metres. *Pyrola minor* I have never seen flowering on Ben Lawers, but it flowers freely and with large blooms at 2,750 feet on Chreag Mhor. *Statice maritima* is a fairly common plant at high altitudes on wet ledges, but I have never seen it above 3,000 feet. As to *Gentiana nivalis* the reference must I think be to the Meall Garbh station over 3,000 feet but not 1,000 metres. I have seen *Agrostis tenuis* at great heights and would admit this grass. *Botrychium Lunaria* I have seen fruiting 1 cm. high on the rocks, and therefore may have passed over it. For *Selaginella Selaginoides*, although a common hill plant, I have no high records.

There have been numerous records made by recent collectors of plants growing at an altitude of over 1,000 metres on these mountains; but as they refer to plants I have never seen, or do not believe to be the forms stated, I leave them alone. This is a sad confession for one who has stood on the summit of Ben Lawers fifty-three times and spent over two hundred days on its sides.

I think the following notes concerning plants worthy of inclusion here. *Gnaphalium supinum* grows and fruits freely at 1,000 feet on the sides of Lawers Burn. This is the lowest point at which any of our alpines, as such, exist and maintain a footing on the range. Then as to our low-country plants going up, *Epilobium angustifolium* L. is to be found at 2,600 feet on Cam Chreag; *Potentilla palustris* Scop., and *Anthyllis vulneraria* L., at 3,000 feet on Ben Lawers; *Myriophyllum alterniflorum* DC., *Menyanthes trifoliata* L., *Chara opaca* Agardh, at 3,000 feet on Creag Mhor; *Rubus Chamaemorus* L., at 2,900 feet on Beinn Heasgarnich; *Orchis maculata* L., at 2,800 feet on Ben Lawers; *Lotus corniculatus* L., at 2,750 feet on Cruach Ardran; *Lathyrus montanus* Bernh., at 2,750 feet on Chreag na Caillich; and a large patch of *Rubus idaeus* L. among the boulders of this same mountain at 2,500 feet; *Geranium lucidum* L. occurs at 2,500 feet on Creag an Lochain; and *Fragaria vesca* L., at 2,400 feet on Beinn Heasgarnich. These are a few records taken at random from my old notes, but their variety is quite enough to show how little is known about the altitudes to which our most common plants ascend. When we find such a tender-looking plant as *Erophila verna* L. at 3,990 feet, we are prepared to meet any unlikely plant there.

It is always interesting to note those plants which reach the highest point on a mountain. As a rule they do not vary much. Here are four sets of examples:—

Ben Lawers—*Arenaria Sedoides, Carex rigida, Nardus stricta, Rachomitrium lanuginosum, Umbilicaria erosa.*

Chreag Mhor—*Arenaria Sedoides, Carex rigida, Festuca ovina, Rachomitrium lanuginosum, Cladina rangiferina*

Beinn Laoigh—*Saxifraga stellaris, Carex rigida, Festuca ovina, Rachomitrium sudeticum, Umbilicaria erosa.*

Ben More—*Saxifraga stellaris, Carex rigida, Festuca ovina, Rachomitrium lanuginosum, Lecidea geographica.*

Glossary.

Anemophilous, wind-fertilised plants. *Chasmophytes*, rock-cleft plants. *Ecology*, study of the house or home of the plants. *Hydrophytes*, water-plants. *Hygrophytes*, marsh-plants. *Mesophytes*, moist soil plants. *Ombrophilous*, rain-loving plants. *Ombrophobous*, rain-hating plants. *Xerophytes*, rain-avoiding plants.

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NOTES.

Scots Pines blown down at Rosneath.—The fine piece of woodland on the Green Isle, Rosneath, suffered much damage in the disastrous storm of 5th November last, about which some particulars from other places are given on pages 5-7 *ante*. A visit to the Green Isle on 25th December, in the company of Messrs. H. Hunter and John Paterson, showed a large number of trees wrecked and lying postrate. For a considerable distance the estate road was impassable, and the block-up so thorough across the wood that we had to take to the beach to get along. The most regretable feature is that many of the tall old Scots Pines (*Pinus sylvestris*) have been destroyed. The late Duke of Argyll writes of this, in 1844, as a "fine wood of Scots Fir" (*Autobiography* (1906) I., page 276), and Mr. W. C. Maughan, in *Rosneath, Past and Present* (1893), says that he recollects when the wood was much thicker, "many of the trees having been separated by severe gales within the last two decades." Still, the pines left were, in number and height, the best of their kind that I knew on the Clyde, and it was a sorry sight to find that about one half of them had succumbed to the November gale.

Some were clean uprooted and overturned, and others broken from the stems, and, as few of them fall clear of other trees owing to their propinquity, the wreckage was widespread. These pines are of the drawn-up type, having grown in close woodland, several being from 80 to 100 feet in height (estimated) and of good girth. They are well proportioned, and similar in appearance to the form found as a planted and sub-spontaneous tree on the dry sandy and gravelly heaths of Surrey (Esher and Byfleet for example) and other southern localities. As compared with the Rosneath trees, the spreading form commonly seen as a native in the highlands is more strongly built and wilder in appearance, but less in average height. Both forms, when well grown, are satisfying to the eyes of tree-men. The nearest considerable gathering to Rosneath of typical highland Scots Pines is Crannach (north of Bridge of Orchy), through which the West Highland Railway Line passes. The Rosneath pines are probably about 150 years old, but the estate had been planted earlier than that, as a writer, dating from about 1630, says—"Rosneth. The family of Argyle have heir a good house most pleasantly situate upon a poynt called the Ross, where they have good planting and abundance of conveniency for good gardens and orchards."—(Macfarlane's *Geographical Collections relating to Scotland* (1907), Vol. II., page 199).—Hugh Boyd Watt, 3 Willow Mansions, West Hampstead, London, N.W.

The Great Skua (*Megalestris catarrhactes*) **in Argyll, and the Little Auk** (*Mergulus alle*) **in Lanark and Dumbarton.**—At our Society's meeting on 30th January, 1912, Mr. John Robertson exhibited, on behalf of Mr. Frank M'Culloch, a Great Skua from Inveraray, obtained in December, 1911. Though not previously obtained in the "Clyde" area, it has been seen several times off the Carrick coast. Mr. M'Culloch also sent a Little Auk, obtained recently near Motherwell. As reported in *The Evening Times* of 22nd January, 1912, one was shot at the mouth of the River Leven, and had just been received for preservation by Mr. Alexander Lees, Alexandria. As in the winter of 1894-95, though probably to a less extent, very many Little Auks have been destroyed, chiefly on the east coast.

Mealy Redpoll (*Linota linaria*) **in Lanark.**—On 7th January, 1912, with Messrs. Alexander Ross and Robert Henderson, I had the pleasure of seeing a small flock of Mealy Redpolls in the Mains Wood, Stepps.—John Paterson.

Popular Names of the Cormorant (*Phalacrocorax carbo*) **in "Solway."**—Referring to the interesting article on this species at the Castle Loch, Mochrum, by R. W. S. and H. W. Wilson, I note that the writers do not give what are perhaps the commonest local names for this species all along the Solway. From the sedate way in which the Cormorant sits at the edge of the ebbing tide it has been likened to an "elder of the kirk." Thus, in Wigtownshire, it is commonly called Mochrum Elder, and in Kirkcudbrightshire Colvend (pronounced Cow'en) Elder.—Hugh S. Gladstone, Capenoch, Thornhill.

Wild Cat from Loch Lomondside—An Old Record.—The following information seems only recently to have been published, and is worth repeating for local record :—

The editor of *The Field*, commenting in the issue of 23rd December, 1911 (page 1395), on a Wild Cat killed at Inverailort (14th December, 1911) weighing 8½ lbs., says that the largest Wild Cat he had ever heard of was one which he was told about in February, 1869, by Mr. J. D. Dougall, 59 St. James's Street [London]. He writes—"This cat was killed, in 1832, by the famous and veteran sportsman of Glasgow, Mr. John Kemp," near Rob Roy's Cave, on the property of the Duke of Montrose, on the north side of Loch Lomond. "It suddenly sprung out upon a collie dog, . . . tearing out its eyes at one stroke of its claws. It then fought desperately until killed. I [J. D. Dougall] saw the trunk of this animal after being skinned for preservation; a congeries of muscle and sinew, and equal in size to the body of a well-grown bull-terrier. Its weight when killed, approached 24 lbs. avoirdupois." This is an enormous weight. The books say little about the weight of this species, but other Scottish Wild Cats are noted in *The Field*, referred to above, as 10 lbs., 12 lbs., 14 lbs., 15 lbs., and 16 lbs.

There used to be (and probably still is) in the Hunterian Museum, Glasgow University, a mounted Wild Cat, presented by the Duke of Montrose, from Loch Lomondside. No further data is given, but it was probably captured between the years 1832 and 1842. This locality must have been a stronghold. There is an entry in the late Mr. E. R. Alston's note-book, 1869 (which I have copied by permission of Mr. J. A. Harvie-Brown) :—"Found on both sides of Loch Lomond; male sometimes nearly four feet long."—Hugh Boyd Watt.

ROBERT GRAY.

The Glasgow Naturalist

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ROBERT GRAY.

THROUGH the kindness of one of our members we are able at this time to realise one of our aspirations, by doing a neglected service to the memory of Robert Gray, in the publication of a copy of a photograph by J. G. Tunny, Edinburgh (Pl. V.). The great services which Gray, who was one of the original promoters of the Natural History Society of Glasgow, rendered to it would alone have justified this step. He was present on 2nd July, 1851, at the meeting at which it was agreed to form the Society. From 1854 to 1856 he acted as Treasurer, and from 1858 to 1871 as Secretary. The influence he exerted in this last capacity in the long period in which he occupied it laid the foundations of the Society's reputation and good fortune. But Gray's own reputation has a wider appeal, which seems to render the publication of his portrait a necessity. He belongs to a larger public than that of the membership of our Society. The publication of *The Birds of the West of Scotland* (1871) greatly extended his reputation. His opportunities for travelling over the region dealt with were exceptional, and enabled him to unify all the material that came to his hand. The West of Scotland, romantic and beautiful and varied as we know it to be, was, in an ornithological sense, a *terra incognita*. To its treatment Gray brought wide experience and a facile pen, which has made his book among a hundred competitors—we had nearly said the *only* one—tolerable to read. A curious thing happened with this work. In subsequent compilations treating of the distribution of birds in Britain, for instance Yarrell's British Birds (fourth edition), the information contained

in Gray was regarded as oracular. Howard Saunders in his Manual showed more discrimination—as the sequal has shown perhaps a little too much. Gray may have given a too ready credence to some of his correspondents, and we cannot always distinguish what is personal knowledge and what is not in his writing, but when he spoke out of his own experience reliance can be placed on what he says. His method is not one to copy—we may tolerate in a classic what would be intolerable in an ordinary work-a-day performance. We would like to see *The Birds of the West of Scotland* re-printed.

Gray was born at Dunbar in Haddingtonshire, and died on 18th February, 1887, at the age of sixty-two years. For further personal particulars a reference may be made to the *Proceedings and Transactions* of this Society, Vol. II., New Series, pages xxii. and xxiii.

The Return of Summer-Birds to the "Clyde" Area in 1912.

By John Paterson.

It is hardly matter of surprise that the very fine spring of 1912 should have, for one of its results, the earlier appearance of our summer-birds than usual. In whatever way the full data on this subject for this year and 1911 are subjected to examination, this emerges. An important factor has been that through the whole period of the spring passage the weather was *continuously* fine. The number of species reported upon below is 27, which is a record since these reports began with the year 1908. There has not formerly been reported in any of these years more than 23 species by the 12th of May. For a parallel to the exceptionally precocious appearance of several species, it would probably be necessary to go back to the remarkable spring of 1893. To the observer the interest in such an inquiry maintains itself in part by the fact that hardly any two years are found to be twins at all points. For the fullness of the reports sent in, the compiler thanks most heartily his numerous correspondents. The results of their enthusiasm speak for themselves in the list which follows :—

LIST OF ARRIVALS OF SUMMER-BIRDS IN THE ORDER OF THEIR APPEARANCE IN 1912.

Common Tern (*Sterna fluviatilis*). In the *Scottish Naturalist* for April, 1912, Mr. George Stout records the occurrence of three Common Terns at Cardross, on 24th February. He writes that he saw them with surprise, which readers of that Journal would, no doubt, share, when they heard about it, but judge their astonishment to read in the following number a record by Mr. J. R. Laurence, writing from Davaar Lighthouse, that in that neighbourhood he had seen two or three on 1st February and ten or eleven on 4th! There is a trap for the unwary in dealing with this species, as the Blackheaded Gull has been mistaken frequently for it, and this has happened with observers who have had great experience of both species. But the conjunction of the observers named, in the same season, cannot be lightly set aside. They must rather be held to confirm each other.

Lesser Black-backed Gull (*Larus fuscus*), one off Brodick, 16th March (R. W. Wilson); Broomielaw, Glasgow, 17th (2) (J. Paterson); Dalmuir, 19th (W. Rennie); Rutherglen, 20th (D. Macdonald).

Wheatear (*Saxicola œnanthe*), Cadder (2), 1st April (Rennie); 3rd, Possil (Rennie); 6th, Cassilis (1) (Rennie); 7th (6) Girvan (Rennie and A. Ross).

Sand-Martin (*Cotile riparia*), Cambuslang, 5th April (1) (Ross); Kelvin, 12th (7) (Rennie); 15th, Beith (2) (J. Craig); 17th, on the Gryffe (T. Malloch).

White Wagtail (*Motacilla alba*), Dalmarnock, 5th April (2) (Ross); Beith, 10th (1) (Craig); Kelvin, 12th, about forty pied and white, latter in majority (Rennie); Cathkin, 15th (Macdonald); other localities till 5th May.

Common Sandpiper (*Totanus hypoleucus*), Beith, 11th April (1) (Craig); Johnstone, 13th (1) (Malloch); Daldowie on Clyde, 13th (2) (H. Wilson); Dalry, 14th (Shanks); Kelvin, 14th (1) (H. Wilson); Kilmacolm, 17th (1) (T. Thornton M'Keith); Garelochhead, 20th (W. R. Baxter).

Swallow (*Hirundo rustica*), Possil (2) (♂) and Kelvin (3) (♂), 12th April (Rennie); Dalbeth on Clyde, 13th (1) (H.

Wilson); Rouken Glen, 14th (1) (John Robertson); on Kelvin, 14th (5) (H. Wilson); Beith, 15th (3) (Craig); Possil, 16th (2) (Rennie); Craigends (Renfrew), 17th (Malloch); Torrance, 17th (1) (Ross); Dalry, 18th (Shanks); Whiting Bay, 18th (Dr. Fullarton); Possil, 19th (14 and 8 mixed ♂ and ♀) (Rennie).

Tree-Pipit, (*Anthus trivialis*), Craigends (Renfrew), 13th April (Malloch); Giffnock, 23rd (1) (Macdonald); Cadder, 23rd (4) (Rennie); following day, 24th, increased greatly at Cadder (Ross); Glenfruin (Baxter), Williamwood and Mainswood (Robertson), and Beith (1 ♂) (Craig), all on 28th.

Chiffchaff (*Phylloscopus rufus*), Rouken, 14th April (1) (Robertson); Lamlash, 23rd (Dr. Fullarton).

Willow-Wren (*P. trochilus*), was generally distributed a week earlier than in 1911. Kilmacolm, 15th April (M'Keith); Beith, 17th (2 ♂) (Craig), and Newton Woods (Malloch); Dunure (J. M'Crindle) (1), Rouken (Wilsons) (1), and Possil (Rennie) (1), all on 19th; Darnley, abundant (H. Wilson), Swinlees Glen, Dalry (9) (R. W. Wilson), Rouken (4/5) (Macdonald), Kilmacolm (M'Keith), Garelochhead (Baxter), Giffnock, fair number (Robertson), all on 20th; Stepps, common (Wilsons), Cadder, common (Paterson), Kilmacolm, singing in every corner (M'Keith), Williamwood (3), and Giffnock (2), all on 21st; Cadder "alive with them" 24th (Ross).

Cuckoo (*Cuculus canorus*), Whiting Bay, seen and heard, 18th April, "earlier than usual" (Dr. Fullarton); Dullatur, calling all day, 21st and 22nd (M'Keith); Ravenscraig, 22nd (Shanks); Beith, 24th (1 ♂) (Craig); near Mearns Castle, 28th (Wilsons); Mugdock (Macdonald), and Kilbarchan (Malloch), 29th.

Corncrake (*Crex pratensis*). Kilmacolm, one "telegraphed" (M'Keith), 19th April; Cathcart, 20th (Robertson); Beith, 22nd (1 ♂) (Craig); Dalry, 24th (Shanks); Craigends (Renfrew), 26th (Malloch); Williamwood, 26th (Paterson); Mearns Castle, 28th (1) (Wilsons).

Yellow Wagtail (*Motacilla raii*), Beith, 19th April (2 ♂) (Craig); Johnstone, 20th (Malloch); Frankfield, 24th (1) (Wilsons); Possil, 25th (14) (Rennie); Brownside, Mearns (2) (Wilsons), Cardowan (2) (Paterson), Williamwood (Robertson), all on 28th.

House-Martin (*Chelidon urbica*), Dunure, 19th April (3) (M'Crindle); Milliken, 20th (Malloch); Kenmuir, 5th May (Ross); Beith, 13th (Craig).

Ring-Ouzel (*Turdus torquatus*), nest with two eggs on 24th April, five eggs on 30th at Loch Thom, where, in 1911, on 25th May, saw full fledged young sitting outside nest (Malloch).

Common Whitethroat (*Sylvia cinerea*), Bridge of Weir, one on 24th April, were not in force till 10th May (Malloch); Darnley Glen, 5th May (1) (Wilsons), and same date, Balmore, pair (Macdonald); Kilmacolm, 6th (M'Keith); Williamwood, 9th (Robertson); Beith (Craig), and Crossford (Paterson), 11th.

Whinchat (*Pratincola rubetra*), Cadder, 26th April (Baxter); Brownside, Mearns, 28th (1) (Wilsons); Bridge of Weir, 11th May (Malloch).

Swift (*Cypselus apus*), Beith, 28th April (2) (Craig); Kenmuir, several (Paterson), Patterton (Wilsons), and on Allander (5) (Macdonald), all on 5th May; Johnstone (Malloch), and Kilmacolm (M'Keith), 9th.

Wood-Wren (*Phylloscopus sibilatrix*), Garelochhead (A. Douglas M'Call), and Lamlash (Dr. Fullarton), both on 28th April; Beith, 29th (1) (Craig).

Sedge-Warbler (*Acrocephalus phragmitis*), Possil, 1st May (1) (Rennie); Beith, 3rd (Craig); Possil again, seven on 4th, where no change till 10th (a dozen), and 12th (more) (Rennie); numbers greater than for a few years back at Possil. Darnley Glen, 5th (1) (Wilsons); Johnstone (Malloch), and Darnley (lots) (Paterson), 12th.

Redstart (*Ruticilla phœnicurus*), Craigends (Renfrew), 2nd May (Malloch); Inchtavannach, Loch Lomond, 12th (Wilsons).

Grasshopper-Warbler (*Locustella nævia*), Beith, 3rd May (Kennedy).

Blackcap (*Sylvia atricapilla*), Cathcart, 5th May (pair) (T. W. Wilson).

Nightjar (*Caprimulgus europæus*), Carmunnock, 6th May (A. F. Kinghorn).

Whimerel (*Numenius phæopus*), passing over Langside, 7th May (Paterson); Bridge of Weir, 29th (Paterson).

Garden-Warbler (*Slyvia hortensis*), Cathcart (Robertson), and Inchtavannach, Loch Lomond (2) (Wilsons), 12th May; Beith, 14th (2) (Craig); Inchtavannach again (7/8) (Wilsons), and full numbers orchard district of Lanark (Paterson), 18th.

Spotted-Flycatcher (*Muscicapa grisola*), Giffnock, 12th May (Robertson); Beith, 19th (Craig).

Additions to the List of Clyde Coleoptera.

(*Second Paper.*)

By Anderson Fergusson.

[Read 26th March, 1912.]

The following list of Coleoptera contains those species, new to the Clyde area, which have been worked out since the last list of additions was published (*The Glasgow Naturalist*, vol. II., p. 83). The original list of the Coleoptera of Clyde, published in the *Hand-book of the Natural History of Glasgow and the West of Scotland* in 1901, contained 986 species. In the first list of additions and the present list there are 214 species, thus making the total number of beetles (exclusive of varieties and introductions) recorded for the area, 1,200. This is roughly a little more than one-third of the British species. Mr. Wm. Evans, in his Presidential Address to the Royal Physical Society of Edinburgh for Session 1906-07, gave the total number of Coleoptera then recorded for the Forth area as 1,328, and he estimated the number which would probably be found in the area at about 1,400. In the same paper Mr. Evans, speaking of the fauna of the Forth area compared with that of the Clyde area, remarked

that, taken all over, the fauna of Clyde would probably prove to be richer than that of Forth both in species and individuals. With this view, so far as it applies to the Insecta, I quite agree, as the geographical position and diversified natural features of our own area from Ben Lui in the north to Loch Ryan in the south are specially favourable to insect life. Mr. Peter Cameron, writing on the Entomology of Clydesdale in *The Fauna and Flora of the West of Scotland* (1876), estimated that in the Clyde area we had probably more than half the British species of Coleoptera. The British list now stands approximately at 3,400 species, so Mr. Cameron's estimate is perhaps a little too high; but I am inclined to think that when the group has been fully investigated, probably a little less than half the British species will be found to occur in the area. There is accordingly a good deal of work to be done in the group before the maximum number of species we may expect to obtain is recorded, but a large amount of material in various collections still remains to be examined and identified, and when this tedious and often difficult task has been overtaken, no doubt many additional species will be found. It has further to be kept in view that, owing to the large extent of the area, and the limited number of workers, many parts of Clyde have not been worked at all, and, if those outlying districts were investigated, as it is hoped they will be in time, they should furnish many new records.

For permission to record their captures I have to thank Messrs. A. A. Dalglish, W. E. Sharp, G. A. Brown, and Wm. M'Leod. The two latter gentlemen are responsible for the records from the Coatbridge district, where, as is evidenced from the number and nature of their captures mentioned in the following list, they are doing excellent work in the group.

The chief difficulty in working a group such as the Coleoptera is the identification of obscure species, but this has been overcome so far as regards the present paper, through the kind assistance of Dr. Sharp, Dr. Joy, Commander Walker, Mr. E. A. Newbery, Mr. E. G. Elliman, and Mr. F. Balfour-Browne.

Those species marked with an asterisk, 12 in number, are apparently new to Scotland.

The arrangement followed is that of Beare and Donisthorpe's Catalogue, and the following abbreviations are used, viz. :—

G.B. = George A. Brown. A.A.D. = Andrew Adie Dalglish, F.E.S. A.F. = Anderson Fergusson. W.M. = Wm. J. M'Leod. E.M.M. = *Entomologists' Monthly Magazine.*

Carabidæ.

HARPALUS RUFIBARBIS, *F.*—**Lanark**, local, Tollcross (G.B.).

BEMBIDIUM CLARKI, *Daws.*—**Lanark**, Coatbridge, in flood refuse (G.B.).

Haliplidæ.

HALIPLUS OBLIQUUS, *F.*—**Lanark**, rare, Whiterigg, April, 1911 (W.M.).

H. RUFICOLLIS, *De G.*—Mr. James Edwards* has recently pointed out that the *H. ruficollis* of our collections includes more than one species and, so far as has been ascertained, the true *ruficollis*, De G. has occurred in the following localities in the area :—**Lanark**, Possil, Hogganfield (A.F.), Coatbridge district (G.B., W.M.); **Renfrew**. Giffnock (A.F.), Crookston (A.A.D.); **Ayr**, Stevenston, Irvine, Barassie, Knoweside (A.F.); **Clyde Islands**, Loch Fad, Bute (A.F.).

H. WEHNCKEI, *Gerh.*—Not uncommon in ponds and ditches. **Lanark**, Lochend, Whiterigg (G.B., W.M.); Possil, Braidwood, Strathaven (A.F.); **Renfrew**, Giffnock (A.F.); **Ayr**, river Irvine, Barassie, Dunure (A.F.).

H. NOMAX, *Browne.*—**Lanark**, Lochend, Whiterigg (G.B., W.M.), Bishop Loch (A.F.); **Clyde Islands**, Loch Fad, Bute, in some numbers, June, 1910 (A.F.).

H. IMMACULATUS, *Gerh.*—Apparently not common, in slowly moving, almost stagnant, water. **Lanark**, Hogganfield, Bishop Loch, August, 1910 (A.F.); **Main Argyll**, Campbeltown, J. J. Walker (J. Edwards, E.M.M., xlvii., p. 1).

Dytiscidæ.

HYDROPORUS ANGUSTATUS, *Stm.*—**Lanark**, not uncommon in Lochend (G.B., W.M.), and also at Possil (A.F.).

Hydrophilidæ.

LACCOBIUS NIGRICEPS, *Th.*—This species was regarded as synonymous with *L. sinuatus*, Mots., but Dr. Sharp† has pointed

* A Revision of the British Species of Haliplus, Latreille, E.M.M. xlvii., p. 1.

† A new species of Laccobius, E.M.M., xlvi., p. 250.

out that the two species are distinct. I have taken one specimen, which is referred by Mr. Balfour-Browne to *nigriceps*, at Knoweside, **Ayr**, in a small ditch running down to the shore.

Helophorus tuberculatus, *Gyll.*—This rare species, which has only hitherto been recorded in Scotland from the Solway area, has recently been taken in some numbers on peat in the Coatbridge district, **Lanark**, by Messrs. Brown and M'Leod. It is very local.

Octhebius lejolisi, *Muls.*—**Ayr**, Knoweside, in small brackish rock pools just above high tide mark, September, 1911. The perfect insect and larvæ occurred together, the latter being much more numerous.

O. rufomarginatus, *Steph.*—**Lanark**, Coatbridge, three specimens in a ditch, July, 1911 (W.M., A.F.).

Hydræna gracilis, *Germ.*—**Lanark**, Coatbridge, in moss at side of a waterfall (G.B., W.M.); **Ayr**, in small streams, Knoweside (A.F.).

Sphaeridium bipustulatum, *F.*, *v.* marginatum, *F.*—**Lanark**, two in dung, Coatbridge (G.B.).

Cercyon quisquilius, *L.*—**Lanark**, Coatbridge, scarce in dung (G.B.); **Ayr**, in vegetable refuse, Shewalton (A.F.)

C. terminatus, *Marsh.*—**Ayr**, one in vegetable refuse, Shewalton (A.F.)

C. lugubris, *Pk.*—**Lanark**, occasional in flood refuse, Coatbridge (G.B.).

Staphylinidæ.

Aleochara spadicea, *Er.*—**Lanark**, in mole's nest, Coatbridge (G.B.).

Homalota insecta, *Th.*—**Lanark**, on banks of stream, Bellshill (G.B.).

H. alpestris, *Heer.*—**Lanark**, Coatbridge, September, 1910 (G.B.).

H. pagana, *Er.*—**Lanark**, rare, in fungi, Coatbridge (G.B.).

H. halobrectha, *Shp.*—**Ayr**, under seaweed, Troon (A.F.).

*H. occulta, *Er.*—**Lanark**, rare, one in fungi, Coatbridge (G.B.).

H. monticola, *Th.*—**Lanark**, rare, four in fungi, Coatbridge (G.B.).

H. debilis, *Er.*—**Lanark**, in flood refuse, Coatbridge (G.B.).

*H. DEFORMIS, *Kr.*—**Lanark**, in flood refuse, Coatbridge (G.B.); **Ayr**, banks of Irvine (A.F.).

H. INCOGNITA, *Shp.*—**Renfrew**, in fungi, Johnstone (A.F.).

H. VALIDA, *Kr.*—**Lanark**, in fungi, Coatbridge (G.B.).

H. TRINOTATA, *Kr.*—**Lanark**, in stable refuse, Coatbridge (G.B.).

*H. TRIANGULUM, *Kr.*—**Ayr**, under seaweed, Knoweside (A.F.).

H. CORIARIA, *Kr.*—**Ayr**, on stumps of trees, Shewalton (A.F.).

H SODALIS, *Er.*—**Lanark**, in fungi, Coatbridge (G.B.); **Ayr**, at sap, Shewalton (A.F.).

H. NIGRICORNIS, *Th.*—**Lanark**, one in refuse and one in bird's nest, Coatbridge (G.B.).

H. RAVILLA, *Er.*—**Lanark**, in fungi, Coatbridge (G.B.).

H. PALUSTRIS, *Kies.*—**Lanark**, in fungi, Possil (A.F.).

H. CORVINA, *Th.*—**Lanark**, in dung, Coatbridge (G.B.).

H. SCAPULARIS, *Sahl.*—**Dumbarton**, Garelochhead, in moss (A.F.).

H. SERICEA, *Muls.*—**Ayr**, Troon (A.F.).

H. SUBTILIS, *Scrib.*—**Renfrew**, in fungi. Johnstone (A.F.).

H. ATRICOLOR, *Shp.*—**Lanark**, in flood refuse and dung, Coatbridge (G.B.); **Ayr**, in refuse, Troon (A.F.).

H. NIGRA, *Kr.*—**Lanark**, in fungi, Coatbridge (G.B.).

H. GERMANA, *Shp.*—**Lanark**, in fungi, Coatbridge (G.B.); **Ayr**, in vegetable refuse, Shewalton (A.F.).

H. VILLOSULA, *Kr.*—**Lanark**, in manure, Coatbridge (G.B.).

H. SETIGERA, *Shp.*—**Lanark**, in flood refuse, Coatbridge (G.B.).

H. CINNAMOPTERA, *Th.*—**Lanark**, one in fungi, Coatbridge (G.B.).

H. MACROCERA, *Th.*—**Lanark**, in dung, Coatbridge (G.B.).

H. ATERRIMA, *Gr.*—**Lanark**, in fungi, Coatbridge (G.B.).

H. PILOSIVENTRIS, *Th.*—**Ayr**, under wood chips, Shewalton (A.F.).

H. LATICOLLIS, *Steph.*—**Lanark**, in grass tufts, Possil (A.F.); **Ayr**, in refuse, Shewalton, Knoweside (A.F.).

H. FUNGI, *Gr.*, *v.* DUBIA *Shp.*—**Lanark**, in fungi and refuse, Coatbridge (G.B.).

H. FUNGI, *Gr.*, *v.* CLIENTULA, *Er.*—**Lanark**, Coatbridge (G.B.).

GNYPETA LABILIS, *Er.*—**Ayr**, on banks of stream, Knoweside (A.F.).

GYROPHÆNA AFFINIS, *Man.*—**Lanark**, common in fungi, Coatbridge (G.B.).

*DIGLOTTA SUBMARINA, *Fair.*—**Dumbarton**, one below high tide mark, Bowling (G.B.).

Oligota inflata, *Man.*—**Ayr,** one in vegetable refuse, Shewalton (A.F.).

Gymnusa brevicollis, *Pk.*—**Lanark**, scarce in tufts of grass on marshy ground, Coatbridge (G.B.).

Hypocyptus longicornis, *Pk.*—**Lanark**. rare, Coatbridge (G.B.); **Renfrew,** in moss, Johnstone, September, 1910 (A.F.).

H. læviusculus, *Man.*—**Lanark**, Coatbridge, rare (G.B.).

Tachyporus pusillus, *Gr.*—**Lanark**, not uncommon in moss, Coatbridge (G.B.), Possil (A.F.).

T. transversalis, *Gr.*—**Lanark**, local, in grass tufts, Coatbridge (G.B.), Frankfield (A.F.).

Tachinus pallipes, *Gr.*—**Renfrew**, one in decaying fungi, September, 1910 (A.F.).

Trichophya pilicornis, *Gyll.*—**Ayr**, rare, one specimen in refuse, Troon, May, 1910 (A.F.).

Quedius talparum, *Deville.*—**Lanark**, in mole's nest, Coatbridge, January, 1912 (G.B.).

Q. fulvicollis, *Steph.*—**Lanark**, in grass tufts in marshy places local and scarce. Coatbridge (G.B., W.M.), Possil (A.F.).

Quedionuchus laevigatus, *Gyll.*—**Lanark**, rare under bark (A.F.).

Philonthus umbratilis, *Gr.*—**Renfrew**, Mearns, September, 1910 (W.M.).

P. ventralis, *Gr.*—**Ayr**, local and scarce, in vegetable refuse, Shewalton (A.F.).

P. discoideus, *Gr.*—**Lanark**, common in stable refuse, Coatbridge (G.B.).

*P. thermarum, *Aub.*—**Stirling**, in debris of old straw, Rowardennan, September, 1911 (W. E. Sharp).

P. nigrita, *Nor.*—**Lanark**, in flood refuse, Coatbridge (G.B.), from grass tufts in marshy ground, Possil (A.F.).

*Gabrius nigritulus, *Gr.*—On banks of streams and ponds and in flood refuse, **Lanark**, Coatbridge (G.B.); **Dumbarton**, Bowling (A.F.); **Ayr**, Shewalton, Barassie, Barr (A.F.).

G. trossulus, *Gr.*—Dr. Sharp† has described several new species of *Gabrius* which were formerly included under *G. trossulus*, Gr. The Clyde records for *trossulus* proper are:—**Lanark**, Coatbridge, in flood refuse (G.B.), Possil, in grass tufts (A.F.); **Ayr**, in flood refuse (A.F.).

† Diagnosis of some new species of Gabrius, E.M.M. xlvii., p. 80.

G. PENNATUS, *Sharp.*—**Renfrew**, Lochwinnoch; **Ayr**, Ayr (A.F.). In flood rubbish.

*G. VELOX, *Sharp.*—**Lanark**, in flood refuse, Coatbridge (G.B.).

G. BISHOPI, *Sharp.*—**Lanark**, in flood refuse, Coatbridge (G.B.); on banks of streams and ponds, **Dumbarton**, Bowling (A.F.); **Ayr**, Stevenston, Irvine, Barassie, Shewalton, Ayr, Barr (A.F.).

ACTOBIUS PROCERULUS, *Gr.*—**Lanark**, Coatbridge (G.B.); **Ayr**, in cut grass, Shewalton (A.F.).

LEPTACINUS BATYCHRUS, *Gyll.*—**Ayr**, one or two specimens in vegetable refuse, Shewalton, September, 1910 (A.F.).

L. LINEARIS, *Gr.*—**Lanark**, in manure, Coatbridge (G.B.); **Ayr**, in vegetable refuse, Shewalton (A.F.). Not uncommon.

LATHROBIUM TERMINATUM *Gr.*, *v.* ATRIPALPE, *Scrib.* (*punctatum*, *B. and D. Cat*).—**Stirling**, Rowardennan (W. E. Sharp); **Lanark**, Possil (A.F.); **Renfrew**, Lochwinnoch (A.F.). In wet places.

MEDON OBSOLETUS, *Nor.*—**Lanark**, rare in refuse, Coatbridge (G.B.).

LITHOCHARIS OCHRACEA, *Gr.*—**Ayr**, one or two in vegetable refuse, Shewalton (A.F.).

BLEDIUS SPECTABILIS, *Kr.*—**Ayr**, two on the shore at Troon (G.B.).

B. TEREBRANS, *Schiödt.*—**Ayr**, on the banks of little streams on the shore, Knoweside (A.F.).

B. ARENARIUS, *Pk.*, *v.* FERGUSSONI, *Joy.*†—**Ayr**, in company with the type form on banks of streams, Barassie and Knoweside (Norman H. Joy, E.M.M., xlviii., p. 44).

OXYTELUS SCULPTUS, *Gr.*—**Ayr**, in vegetable rubbish, Shewalton (A.F.).

TROGOPHLŒUS BILINEATUS, *Steph.*—**Lanark**, in manure, Coatbridge (G.B.).

T. CORTICINUS, *Gr.*—**Lanark**, in flood refuse, banks of Clyde, at Mount Vernon (G.B.).

LESTEVA HEERI, *Fauv.* (*sicula*, *Er.*)—In damp moss at sides of streams, **Lanark**, Coatbridge (G.B.), Frankfield (A.F.); **Ayr**, Shewalton (A.F.).

† Mr. E. A. Newbery points out (E.M.M., xlviii., p. 64) that this variety is the same as *B. arenarius, var. a.*, of Rey, for which the latter proposes the name of *Bledius minor*.

Lathrimæum atrocephalum, *Gyll.*—**Lanark**, under a carcase, Coatbridge (G.B.); **Ayr**, under wood chips, Shewalton (A.F.).

Proteinus brachypterus, *F.*—**Lanark**, Coatbridge (G.B.).

P. macropterus, *Gyll.*—**Renfrew**, rare, in decaying fungi, Johnstone, September, 1910 (A.F.).

P. atomarius, *Er.*—**Lanark**, rare, in fungi, Coatbridge (A.F.).

*Megarthrus affinis, *Müll.*—**Ayr**, three specimens in vegetable refuse, Shewalton, September, 1910 (A.F.).

M. sinuatocollis, *Lac.*—In vegetable refuse and fungi, **Renfrew**, Johnstone; **Ayr**, Shewalton (A.F.).

Clambidæ.

Clambus minutus, *Stm.*—**Ayr**, scarce in vegetable refuse, Shewalton, September, 1910 (A.F.).

Silphidæ.

Agathidium convexum, *Shp.*—**Stirling**, one in rotten stump (W. E. Sharp).

Anisotoma punctulata, *Gyll.* (*litura*, *Steph.*).—**Ayr**, by sweeping bent on the coast, rare, Ardrossan, Ayr, Knoweside (A.F.).

Colon viennense, *Hbst.*—Rare. **Renfrew**, one by sweeping, Crookston (A.A.D.); **Ayr**, two sweeping, Ayr (A.F.).

Trichopterygidæ.

Trichopteryx atomaria, *De G.*—**Ayr**, in moss, Ayr (A.F.).

T. grandicollis, *Man.*—**Ayr**, common in vegetable rubbish, Shewalton (A.F.).

T. lata, *Mots.*—**Ayr**, in refuse, Shewalton (A.F.).

Ptilium spencei, *All.*—**Stirling**, in decaying fungi, Milngavie; **Ayr**, in vegetable refuse, Shewalton (A.F.).

Ptenidium nitidum, *Heer.*—In vegetable refuse, moss, &c., **Stirling**, Milngavie (A.F.); **Lanark**, Possil (A.F.); **Ayr**, Shewalton, Ayr (A.F.).

Coccinellidæ.

Coccinella 11-punctata, *L.*, *v.* brevifasciata, *Weise.*—**Clyde Islands**, Machrie Bay, Arran (Mrs. Sillars).

Endomychidæ.

Mycetæa hirta, *Marsh.*—**Lanark**, abundant in stable refuse, Coatbridge (G.B.).

Micropeplidæ.

MICROPEPLUS STAPHYLINOIDES, *Marsh.*—**Lanark**, rare one in moss, Coatbridge (G.B.).

Nitidulidæ.

BRACHYPTERUS PUBESCENS, *Er.*—**Lanark**, by sweeping, Mount Vernon (G.B.); **Ayr**, sweeping, Dunure (A.F.).

EPURÆA PUSILLA, *Ill.*—**Ayr**, under bark and chips, not uncommon, Shewalton (A.F.).

NITIDULA BIPUSTULATA, *L.*—Under carcases, &c., **Stirling**, Milngavie (A.F.); **Ayr**, Irvine (W.M.), Knoweside (A.F.).

SORONIA PUNCTATISSIMA, *Ill.*—**Renfrew**, rare, at roots of a tree, Mearns (W.M.).

RHIZOPHAGUS PERFORATUS, *Er.*—**Lanark**, under fir bark, Coatbridge (G.B.).

R. FERRUGINEUS, *Pk.*—**Ayr**, under fir bark, not very frequent, Shewalton (A.F.).

Lathridiidæ.

MELANOPTHALMA GIBBOSA, *Hbst.*—**Ayr**, in cut grass, Knoweside (A.F.).

Cucuiidæ.

SILVANUS SURINAMENSIS, *L.*—**Lanark**, in bakery refuse, Coatbridge (G.B.).

Cryptophagidæ.

*CRYPTOPHAGUS BADIUS, *Stm.*—**Lanark**, rare, in fungi, Coatbridge (G.B.).

C. ACUTANGULUS, *Gyll.*—**Renfrew**, one in house, Greenock (A.F.).

C. AFFINIS, *Stm.*—**Lanark**, in stable refuse, Coatbridge (G.B.).

C. BICOLOR, *Stm.*—**Lanark**, common in stable refuse, Coatbridge (G.B.).

HENOTICUS SERRATUS, *Gyll.*—**Dumbarton**, one at Arrochar, July, 1906 (R. S. Bagnall, E.M.M., xliii., p. 234); **Ayr**, one amongst sawdust, Shewalton, September, 1910 (A.F.). Apparently very rare.

ATOMARIA NIGRIVENTRIS, *Steph.*—**Lanark**, in refuse, Coatbridge (G.B.).

A. NIGRIPENNIS, *Pk.*—**Lanark**, not common, in stable refuse, Coatbridge (G.B.).

A. pusilla, *Pk.*—**Lanark**, by sweeping, Coatbridge (G.B.).

A. apicalis, *Er.*—By sweeping in vegetable refuse, &c., **Stirling**, Milngavie (A.F.); **Lanark**, Coatbridge (G.B.); **Ayr**, Shewalton (A.F.).

Ephistemus gyrinoides, *Marsh.*—**Ayr**, common in vegetable refuse, Shewalton (A.F.).

Scaphidiidæ.

Scaphisoma boleti, *Pz.*—**Ayr**, rare, one specimen, in rotten wood, Knoweside, May, 1910 (A.F.).

Mycetophagidæ.

Mycetophagus quadriguttatus, *Müll.*—**Lanark**, abundant in stable refuse, Coatbridge (G.B., E.M.M., xlvii., p. 68).

Parnidæ.

Elmis subviolaceus, *Müll.*—In moss in streams, local, but plentiful where it occurs, **Renfrew**, Greenock; **Ayr**, Knoweside (A.F.).

E. cupreus, *Müll.*—**Ayr**, apparently rare, one in moss in stream along with the preceding species and *E. æneus*, Knoweside. September, 1911 (A.F.).

Limnius tuberculatus, *Müll.*—Not uncommon in moss in running water, **Ayr**, Irvine, Knoweside (A.F.).

*L. troglodytes, *Gyll.*—In lochs, rare, **Ayr**, Knoweside, **Clyde Islands**, Loch Fad, Bute (A.F.). My specimens have been examined by Dr. Joy. Fowler (Coleoptera of the British Islands, III., p. 379), states that the species is found in running water, but I have only taken it in lochs, and I have never met with it in streams with *L. tuberculatus*.

Scarabæidæ.

Aphodius constans, *Duft.*—**Lanark**, rare, one in dung, Glenboig (G.B.).

A. pusillus, *Hbst.*—**Lanark**, Coatbridge and Mount Vernon (G.B.); **Ayr**, Troon (A.F.).

Ptinidæ.

Ptinus fur, *L.*—**Lanark**, crawling on a wall, Coatbridge (G.B.).

Niptus crenatus, *F.*—**Lanark**, one on a wall, Coatbridge (G.B.).

Chrysomelidæ.

GALERUCELLA FERGUSSONI, *Fowler.*†—**Lanark**, on *Comarum palustre*, local, but abundant where it occurs, Possil (A.A.D.), Frankfield (A.F.).

*LONGITARSUS GRACILIS, *Kuts.*—**Lanark**, rare, one by sweeping, Coatbridge (G.B.). I have also taken two specimens of this species in 1901 at Tayvallich, in the Argyll faunal area.

CASSIDA NOBILIS, *L.*—**Dumbarton**, Ardpeaton, Loch Long, on *Silene maritima* (Wm. Evans, *The Glasgow Naturalist*, III., p. 96).

Tenebrionidæ.

TENEBRIO OBSCURUS, *F.*—**Lanark**, common in bakery refuse, Coatbridge (G.B.).

TRIBOLIUM CONFUSUM, *Duv.*—**Lanark**, common in bakery refuse, Coatbridge (G.B.).

Melandryidæ.

HALLOMENUS HUMERALIS, *Pz.*—**Lanark**, rare, in fungi on a rotten log, Coatbridge (G.B.).

Mordellidæ.

ANASPIS COSTÆ, *Emery* (*thoracica*, *Brit. Cat.*).—**Lanark**, by beating hawthorn, Coatbridge (G.B.).

Anthicidæ.

ANTHICUS FLORALIS, *L.*, *v.* QUISQUILIUS, *Th.*—**Ayr**, in vegetable refuse, Shewalton (A.F.).

Curculïonidæ.

APION PALLIPES, *Kirby*—**Lanark**, very local, on *Mercurialis*, Cleghorn (A.F.).

A. BOHEMANI, *Th.*—**Ayr**, by sweeping, Dunure (A.F.). Not common.

A. ONONIS, *Kirb.*—by sweeping on the shore, Knoweside (A.F.).

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† Fowler, "Description of a new species of Galerucella" (E.M.M., xlvi., p. 228); Dalglish, "Further Captures of *Galerucella fergussoni*, Fowl." (*l.c.*, xlvi., p. 262); Fergusson, "A Beetle, new to science, from Possil Marsh and Frankfield Loch." (*The Glasgow Naturalist*, III., p. 36).

A. seniculum, *Kirb.*—**Ayr**, one off *Trifolium* on railway bank, Knoweside (A.F.).

A. marchicum, *Hbst.*—**Ayr**, Irvine, July, 1910 (W.M.)

Orchestes salicis, *L.*—**Lanark**, scarce on willows, Possil (A.F.), Tory Glen (W.M.).

Ceuthorhynchus cyanipennis, *Germ.*—**Lanark**, by shaking tufts, Coatbridge (G.B.).

C. hirtulus, *Germ.*—**Ayr**, in flood refuse, Shewalton (A.F.).

Litodactylus leucogaster, *Marsh.*—**Ayr**, apparently rare, one on aquatic plants in pond near Troon (A.F.).

*Balaninus rubidus, *Gyll.*—**Lanark**, by sweeping, Coatbridge (G.B.).

Scolytidæ.

Hylastes ater, *Pk.*—**Ayr**, under bark of fir stumps, Shewalton, not uncommon (A.F.).

INTRODUCED SPECIES.

Cryptamorpha desjardinsi, *Guér.* **Lanark**, one in a house in Glasgow. Imported with bananas (A.F., E.M.M., xlvi., p. 238).

Ptinus tectus, *Boield.*—**Lanark**, common in stable refuse and in a bakery, Coatbridge (G.B., E.M.M., xlvii., p. 68).

Notes on Plants from the Vice-Counties of Lanark (77), Banff (94), and Dumbarton (99).

By Laurence Watt.

[Read 26th March, 1912.]

The following notes relate to plants gathered in the three Vice-Counties above mentioned, and exhibited to the Society. They are submitted with the view of placing upon record information as to the localities where the various specimens were obtained.

Spergula sativa, Boenn.—In the Third Edition of his *Students' Flora*, Sir J. D. Hooker describes this as a variety of *S. arvensis*, Linn.; but in the Tenth Edition of the *London Catalogue* it is

elevated to the rank of a species. It is a much larger and stouter plant than *S. arvensis*, and the seeds are winged. It has been reported from 37 Vice-Counties, and is a new record for Dumbarton.

Hypericum maculatum, Crantz (= *H. dubium*, Leers).—This St. John's-Wort, though fairly common in the South, is rarer in the North. It grew on the railway bank near the River Spey at Ballindalloch Station, this being a new record for Banffshire.

Galium saxatile, Linn., var. *lineare*, Gray.—This form occurred on the railway bank near Dumbarton. It is a much larger plant than *G. saxatile*, and the leaves are a more glossy green, but have the same spreading habit. The flowers are white, and the fruit smooth. This variety is not included in any of the British Floras, and is a new record for Dumbarton. Mr. P. Ewing, F.L.S., states that he has observed it on the railway bank at Dalmally, Argyllshire.

Hieracium vulgatum, Fr., var. *sejunctum*, W. R. Linton.—I have exhibited to the Society specimens obtained in two different localities, and varying in external appearance only. Those gathered by Mr. Craib on rocks by the side of the River Deveron, at Forglen, Banffshire, at an altitude of little over 100 feet, have few hairs on the stem and leaves; while those obtained in Glenlivet, at an altitude of 700 feet, are copiously covered with long white hairs. It appears to be a common plant in the last-mentioned locality, and has not hitherto been recorded for Banffshire.

Pyrola media, Sw. — Although reported from 43 Vice-Counties, this is a rare plant to gather. In the *Glasgow Catalogue*, issued by Mr. P. Ewing, F.L.S., it is recorded for Lanark, on the authority of Sir W. J. Hooker. The latter was Professor of Botany in the University of Glasgow in 1830, when his *British Flora* was published, and he must have seen the plant prior to that year. In July, 1879, I gathered it in Fiddler's Gill, Lanark, which may possibly be the same locality where it was seen by Hooker.* In looking over the

* It may be noted that Sir W. J. Hooker mentions Dumbarton Common as a station for *Samolus Valerandi*, Linn. I gathered it there a few years ago, within the tidal area of the River Leven, but the plants were very small.

reports of the various excursions of the Society, I do not find this plant mentioned as having been found in any of the districts visited, either in Lanark, Renfrew, or Dumbarton. The plants submitted from Rothiemay, which were gathered by Mr. Craib, were the only ones got by us in Banffshire.

P. minor, Linn.—In a paper by Mr. P. Ewing, F.L.S., on "The Summit Flora of the Breadalbane Range," he mentions that he never found *P. minor* flowering at a high altitude on Ben Lawers, although he found it on Chreag Mhor at an altitude of 2,750 feet.* I have brought before the Society some small plants of this species gathered on Ben Lawers at an altitude of 2,600 feet. Mounted on paper, they appear larger than they seemed when growing, as they were then almost buried amongst the moss and short grass. I have never seen *P. minor* in Dumbartonshire. The only records I have of its occurrence in that county are from the reports of this Society's excursions to Cumbernauld Glen, and of the excursion of the Andersonian Naturalists' Society to Caldarvan, where it occurred on the roadside. In Gallangad Glen the latter Society also discovered *P. secunda*, Linn., the rarest of all the species.

Thymus Chamædrys, Fr. = var. *ovatus* (Mill.).—This I also gathered in Glenlivet. It is quite a different-looking Thyme from those which grow on the hills in our own district. The leaves are small and distant, the heads more compact, and the hairs few.

Atriplex calotheca, Fr., was obtained by me on the sea-shore at Whitehills, Banff, in July, 1910, but in too immature a condition for identification. At my request, however, Mr. Yeats, secretary of the Banff Field Club, sent me last year a few fruiting spikes. These were forwarded to Mr. A. Bennett, F.L.S., who identified the plant, and stated that it had been reported from Wigtown, Argyle, and Sutherland. It will probably be found all round the northern coast. It flowers early in July; and by the time the fruit has ripened, the leaves are nearly all off. It then resembles *A. Babingtonii*, Woods, and may perhaps be often passed over as such.

* *The Glasgow Naturalist*, Vol. IV., p. 60.

Potamogeton pectinatus, Linn., occurs in a tidal burn at Milton, near Dumbarton, where it grows and fruits under the surface of the water.* I visited the place on three different occasions, expecting to see the fruiting spikes of the plant appear above the surface, like those of most of the other species of the genus; but no signs of the flowers being visible, a fine specimen was secured and brought in by means of a dredge. This showed the flowering and fruiting stems, which are shorter than the leaves. The plants occur in great quantity, and resemble a miniature forest in the water.

P. interruptus, Kit. (= *P. flabellatus*, Bab.), grows in the same tidal burn in which *P. pectinatus* occurs; but, unlike that species, it is found in masses on the surface of the water, and grows up from a small corm. The fruiting spikes are easily noticeable, as they grow straight up from the stem. Few of these, however, were to be seen amongst the large mass of leaves on the plant.

Ruppia rostellata, Koch.—A small creeping form occurs in the same burn. This species buries itself in the mud, so that only a few green leaves are to be seen on the surface. It also grows on tidal mud in the South of England.

Scirpus fluitans, Linn.—This was plentiful in the curling pond at Fort-Augustus, Inverness-shire, but was only coming into flower at the end of September—apparently an unusually late date for the plant.

Scirpus maritimus, Linn., var. *monostachys*, Sonder, occurs on the side of the River Clyde at Dumbarton, in pools which are filled at every tide. This form was first recorded from Cornwall, and is a new record for Dumbarton.

S. maritimus, Linn., var. *compactus*, Rich. (= var. *conglobatus*, Gray), grows on the side of the River Clyde below Cardross.

* The foreshores of the River Clyde, between Bowling and Dumbarton, are fast changing in character, and may in a few years be largely utilized for industrial purposes. It will be a long time, however, before the various species of *Potamogeton* are cleared out of the tidal burn referred to in these notes; and as the line of the North British Railway runs between the burn and the Clyde, and the outlet of the stream must be kept clear, every successive tide brings in a new supply of brackish water.

Asplenium Ruta-muraria, Linn.—A very pretty form of the Wall-rue grows on Dumbarton Castle, and is distinguished by its suborbicular, undivided, and finely crenated fronds, the characteristic features of which are particularly well seen on the barren fronds. This is entirely different from the usual form with notched and wedge-shaped fronds, so common in our district. Mr. Bennett informs me that a similar form is figured by Newman in his work on ferns, but no name is given by him to it.

I have to thank Mr. Arthur Bennett, F.L.S., and the Rev. E. F. Linton, F.L.S., for kindly examining and naming the plants submitted to them, and for supplying information regarding the characteristics and distribution of the various species and varieties.

Mycological Notes.

By D. A. Boyd.

[Read 27th February, 1912.]

Podosphæra myrtillina (Schub.) Kunze.

This fungus belongs to the Perisporiaceæ, a group of Ascomycetes, numerous forms of which occur as common parasites on leaves of various trees, shrubs, and herbaceous plants. In their early stage of development, many species of Perisporiaceæ produce a conspicuous white mycelium, known to gardeners as "mildew," which overruns the affected leaves, covering them with a coating of delicate hyphæ on which are produced chains of conidia of the type of *Oidium* and allied genera of the Hyphomycetes or simple moulds. At a later stage of growth, there are developed on the mycelium numerous tiny perithecia, at first of a yellow colour, but becoming dark-brown or blackish when mature. These contain the asci and spores.

In the genus *Podosphæra*, the perithecia are furnished, either at their apex or at their equatorial region, with appendages which are forked or shortly branched at the tip; and each perithecium encloses a solitary ascus containing eight spores.

The most common species of *Podosphæra* is *P. oxyacanthæ* (DC.) De Bary, which in its conidial state is often very abundant on living leaves and young shoots of hawthorn, frequently in such profusion as to impart to the hedges the appearance of having been sprinkled with whitewash.

I have brought under the notice of the Society some specimens of *P. myrtillina* (Schub.) Kze., a species which is of much less frequent occurrence than the last-named, but seems to be usually rather abundant where it grows. It was first recorded for Scotland about forty years ago by the Rev. Dr. Keith, of Forres, who discovered it on living leaves of blaeberry (*Vaccinium Myrtillus*) at Dunphail, Morayshire, and reported it under the name of *Podosphæra Kunzei* Lev., var. *myrtillina* Kunze.* In 1887 it was found by Professor Trail a few miles from Aberdeen,† and in 1908 by myself, in the woods at Beaufort Castle, near Beauly, Inverness-shire.‡ Up till 1909, the only British localities recorded for this species were in districts north of the Tay; but in the autumn of that year, at a fungus-foray of the Edinburgh Field Naturalists' and Microscopical Society in Currie Glen, Borthwick, Midlothian, *P. myrtillina* was detected on a patch of blaeberry bushes near the foot of the glen.§ Last autumn, when visiting Dumfriesshire with the Cryptogamic Society of Scotland, I observed this fungus on blaeberry bushes on the Gallow Hill, Moffat, where it occurred in considerable abundance. By these additional records, the ascertained distribution of *P. myrtillina* in Scotland is now extended southward to include the Provinces of "Forth" on the east and "Solway" on the west. Although not yet reported for the Clyde Area, it is very likely to occur on *Vaccinium Myrtillus* in wooded districts, as around Inveraray or adjacent to Loch Lomond.

Professor Trail (*l. c.*) has remarked that blaeberry bushes affected with this fungus grow much taller than healthy ones. I cannot say, however, that my own experience has tended to confirm this opinion. In Renfrewshire, Ayrshire, and other

* *Scottish Naturalist*, Vol. II. (1873-74), p. 312.

† *Proc. and Trans. Nat. Hist. Soc. of Glasgow*, Vol. III. (New Series), p. 12.

‡ *Trans. Brit. Myc. Soc.*, Vol. III., p. 48.

§ *Trans. Edinb. Field Nat. and Micr. Soc.*, Vol. VI., Part IV. (1911), p. 343.

districts in the west, I have in autumn very often examined gigantic bushes of *V. Myrtillus* without finding on their foliage the slightest trace of the parasite; while in the other localities where *P. myrtillina* actually occurred, the affected bushes did not show any abnormal development either in size of leaf or length of stem or branch.

Cronartium ribicolum Deitr.

Like the Hollyhock Rust (*Puccinia malvacearum* Mont.) and several other parasitic fungi, this species appears to have been a comparatively recent introduction to the British Isles. It had not as yet been recorded for our country in 1889, when the late Dr. C. B. Plowright published his *Monograph of the British Uredineæ and Ustilagineæ*, but was discovered by him in 1892, on bushes of black and red currant in the garden of Oakwood House, in the neighbourhood of King's Lynn. About the same time the æcidia (= *Peridermium strobi* Kleb.) were also discovered on living bark of Weymouth Pine (*Pinus Strobus*) in England.* Since then it has extended its range of distribution to Scotland, where it has become established in various districts, and threatens to prove very destructive to the Weymouth Pine in localities where that tree has been extensively planted.

At a meeting of the Society held on 25th October, 1910, I exhibited specimens of *C. ribicolum* from Perthshire, and stated that the teleutospores were locally abundant on leaves of black-currant in gardens at Crieff and Killin.† During the visit of the Cryptogamic Society of Scotland to Dumfriesshire last September, I found *Cronartium* to occur plentifully on black-currant leaves in the gardens around Moffat. In a small coppice, apparently the site of an old garden, at Dumcrieff, near Moffat, several black-currant bushes affected with this parasite were growing in proximity to a Weymouth Pine. The latter appeared to be in a very unhealthy condition; and my attention was drawn by Dr. A. W. Borthwick, Edinburgh, to numerous æcidia of the fungus which were developed on the bark of the living branches, and were slowly but surely accomplishing their work of destruction. It is interesting to note the occurrence of this species in provinces

* *Gardeners' Chronicle*, Vol. XII. (3rd Series), p. 44.

† *Glasgow Naturalist*, Vol. III., p. 101.

so widely separated as "Tay" and "Solway." It has not yet been recorded for our own district, but should be looked for in localities where *Pinus Strobus*, *P. Cembra*, and *P. Lambertiana* are extensively grown.

It has been remarked that in America, the native country of the Weymouth Pine, *Cronartium ribicolum* is as yet unknown, although several species of pine are affected by æcidia of other forms of *Cronartium*. The only other British species of the genus is *C. flaccidum* (A. & S.) Wint., of which the uredospores and teleutospores have occurred on leaves of pæony in various parts of England, but the æcidia have not yet been discovered.*

Some Echinorhynchs from the Clyde Area.

By Richard Elmhirst, F.L.S.,

Superintendent of the Millport Marine Biological Station.

[Read 28th March, 1912.]

Echinorhynchus acus, Rudolphi.

1808. *E. acus*, Rudolphi, Entoz. Hist. Nat., Vol. II., p. 279.
1851. *E. acus*, Diesing, Syst. Helminth., Vol. II., p. 39.
1909. *E. acus*, Scott, 26th Ann. Rep. Fish. Brd., Scotland, p. 87. Pl. IV., figs. 7 and 8.

Occurs commonly in Gadoids; I have found it in Cod (*Gadus callarius*), Lythe (*G. pollachius*) and Saithe (*G. virens*). It is also recorded from the Flounder (*Pleuronectes flesus*) in the *Fauna and Flora of the Clyde Area*, 1901.

The males range up to 21 mm. in length, and the females to 50-55 mm. This species is recorded by Diesing from *Conger niger*; but I have failed to find it in Congers from the Clyde, even in those which have lived in the aquarium for months or years, and fed chiefly on Saithe, many of which must have been infected judging by the proportion of infections obtained in those examined from the same shoals. This tends to prove that *E. acus*

* Plowright, *l.c.*, p. 254. Massee, *Diseases of Cultivated Plants and Trees* (1910), p. 320.

cannot pass from one final host to another. Being essentially intestinal parasites they probably cannot exist under gastric conditions.

[Since writing the above note I have examined a female cod which had lived for a long time and spawned in the aquarium. She was in very poor condition after spawning, and sores had appeared on her body and tail. The rectum of this specimen contained two *E. acus*, both of which were deeply pigmented, being of a brownish-black colour. The peritoneum of this cod also was of a deep black colour instead of the normal grey of a healthy fish.]

Echinorhynchus haeruca, Rudolphi.

1851. *E. haeruca*, Diesing, Syst. Helminth., Vol. II., p. 29.

I have examined specimens taken from the common frog (*Rana temporaria*) in the Beith district by Mr. J. Ritchie, Junr. The larval stage of this species occurs in the fresh-water louse (*Asellus aquaticus*).

Echinorhynchus cylindraceus, Schrank.

1905. *E. cylindraceus*, de Marval, Monographie des Acanthocéphales d'oiseaux, in Revue Suisse de Zoologie, Vol. XIII., pp. 249-260, Pl. I., figs. 12-14 and 25.

Occurs commonly in the Blackbird (*Turdus merula*) and the Starling (*Sturnus vulgaris*). Is generally very wrinkled and shrunken in appearance, and may be up to 12 mm. in length.

Echinorhynchus hystrix, Bremser.

1905. *E. hystrix*, de Marval, op. cit., pp. 281-284, Pl. II., figs. 78-80.

A rather elegantly pear-shaped species, whose body is practically covered with small spinules; seldom more than 7 mm. in length. Occurs abundantly in the rectum of Shags (*Phalacrocorax graculus*) and Cormorants (*P. carbo*). The larva of this species probably occurs in some of our shore-frequenting fishes, as both hosts never seem to feed on invertebrates.

ECHINORHYNCHUS LANCEA. Westrumb.

1905. *E. lancea*, de Marval, op. cit., pp. 296-299, Pl. III., figs. 108 and 109, 112-116.

Recorded from the Lapwing (*Vanellus vulgaris*) in the *Fauna and Flora of the Clyde Area*, 1901; I have not yet obtained it in this district.

ECHINORHYNCHUS LONGICOLLIS, Villot.

1905. *E. longicollis*, de Marval, op. cit., p. 299, Pl. IV, fig. 134.

This species originally recorded by Villot from the Turnstone (*Strepsilas interpres*) and the Blackheaded Gull (*Larus ridibundus*) is doubtfully distinct from *E. frasonii*. My specimen, which is intermediate between them, was taken from the intestine of an immature Common Gull (*Larus canus*).

ECHINORHYNCHUS PIRIFORMIS, Bremser.

1905. *E. piriformis*, de Marval, op. cit., pp. 308-310, Pl. I., figs. 29 and 30, 35 and 36.

I obtained two dozen specimens of this species from a blackbird (*Turdus merula*) in November, 1909.

Reviews.

A Hand-List of British Birds. By Ernst Hartert, F. C. R. Jourdain, N. F. Ticehurst, and H. F. Witherby. Witherby & Co., London; 7s. 6d. net.

In view of the many additions which have been made in recent years to the list of birds found in Britain, and the amount of attention that is being paid to racial forms, none will deny that that there is room for such a work as the present. In the case of each species a brief synonymy is given, the distribution in this country and abroad is separately treated, and in the case of many species their migrations in these isles are dealt with. The authors are to be congratulated on the completion of a useful and valuable work which must have involved much research. We propose to look at it here with regard to the distribution in the field of the operations of this Society, chiefly in the part of Scotland which has Glasgow for its centre. Accuracy has been sacrificed in

places in the attempt to convey more than the space allowed admits of, but the fault, if such it be, is common to most such efforts. There is proof of great care in dealing with the facts of distribution. The work is indeed remarkably successful in this particular, and we must ask our readers not to be misled by anything said hereafter into the belief that this is not so. Remarks quoted here appear under the sub-heading "Scotland" in the distribution notes.

The Hooded Crow is not "abundant north and west and islands," as in Renfrew, Ayr, and Wigtown it is rare, and is certainly not abundant in Bute and Arran, though occurring there. The Corn-Bunting is more than is implied in "generally local elsewhere," that is away from coastal regions. For instance, to take widely-separated examples, it is common north-east of Glasgow and in the Howe of Fife. The Yellow Wagtail is more abundant in Clyde, from Crossford through Renfrew to South Ayrshire, than in all the rest of Scotland put together, a remarkable fact not to be read into the account of its distribution in this list. The White Wagtail again is not "chiefly noticed in coastal regions" on west side. It is common annually in central Clyde, away from the coasts. The Wood-Wren is said to become "more thinly distributed northwards," but it is precisely in the natural woods in our sea-lochs in the north-west of Clyde that it becomes really common. Something of the same sort obtains in the case of the Grasshopper-Warbler. It is certainly not "scarcer northwards" in Clyde, and, indeed, is more of a highland than a lowland species, becoming characteristic at Helensburgh moor and northwards therefrom by Gareloch, Loch Long, and Glenfalloch. The account of the Blackcap's distribution is not satisfactory. The Whitethroat, said to be "generally distributed in the south, locally commom in centre," should surely be described as "common south and centre." Of the Alpine Swift we read "*Scotland*—None," although it has been captured and seen in Clyde. On the other hand we are credited with the Green Woodpecker in Clyde, somewhat to our surprise. The American Hawk-Owl, got at Maryhill in 1863, should be credited to Lanark, not Renfrew, and the Greenock Hawk-Owl we do not know to be the American form, although it is credited to it in this list. England, Wales, and Ireland are all credited with the

Bittern as a species breeding formerly. Scotland should have the same credit. In the southern half of Scotland it was a well-known resident species two or three centuries ago. The Long-tailed Duck is said to be "very common" on the west side of Scotland, but this description does not apply to "Clyde," which is still a large part of the West of Scotland. Too much is implied in this case, but in that of the Red-breasted Mugauser too little, as it is common in Dumbarton, Bute, and "Clyde Argyll," and this is not conveyed by the description in the list. The Cormorant as a breeding species is not confined to "cliffs" inland, as readers of this journal well know (see pages 1-4). That the Stock-dove first nested in Scotland about 1877 we do not believe; 877 would not have startled us. There has been, we think, a deplorable lack of imagination, not to mention a more homespun quality, in dealing with the former occurrence of this species in Scotland. Rennie, in his edition of Montagu (1831), refers to his own *Architecture of Birds*, page 161, when he stated that two or three pairs of Rock-doves nested at "Howford, near Mauchlane" (*sic*), to his own knowledge. At that time the Rock-dove and Stock-dove were confounded, the former getting credit due to the latter through the accident of the situation in which the latter nested and the trivial name of the first-named. The Stock-dove is well known where Rennie, mistakenly, as a youth, supposed he knew the Rock-dove, and the inference, we think, may be left with safety to any unprejudiced intelligence.

There are other considerations that help us to a similar conclusion, but we cannot afford space to enter upon them now.

Clyde islands, we have already pointed out, are not in the Inner Hebrides, nor is Loch Lomond in Argyll (see page 198 of the list), nor Montrose in Fife! (page 165). More excusable is the error which gives Dumbarton credit for the Stone-Curlew. Muirhouse, where the bird referred to was got, is, we understand, on Blairskaith Moor, Baldernock Parish (where Bunty pulled the strings), in Stirlingshire. The Grey Plover we know now is a quite regular visitor in small numbers to the Ayrshire coast, though stated in list to be "very rare north of Solway on west." The occasional records from the Hebrides (Coll and Tiree) and the paucity of observers there, its frequency in Clyde, the occasional records from Solway, and its known frequency formerly

there, make any categorical statement about the Ruff's decided scarcity in the west of Scotland compared with the east of little value in the absence of fuller evidence. The Black-headed Gull is not more "frequent inland in winter" than in summer with us, being common at all seasons, and nesting in great numbers inland. In winter the Herring Gull is not uncommon far inland with us. It is quite common. Of the Lesser Black-backed Gull it is stated that it nearly abandons the extreme north mainland in winter. The fact is, we believe, that for all practical purposes it abandons Forth, Clyde, and Solway in winter. It returns just before the Wheatear. Ailsa Craig is not mentioned under breeding-places of the Kittiwake. That there are few records of the nesting of the Water-Rail in Scotland is probably correct, but we have no doubt that it could be found in most places suited for it in the nesting season south of the Grampians.

A Catalogue of the Vertebrate Fauna of Dumfriesshire. By Hugh S. Gladstone. Dumfries, J. Maxwell & Son; 5s. net.

In the few weeks that have elapsed since this little work came to hand, we have found ourselves referring to it over and over again, which we take to be a proof that there is room for it. We cannot do more than congratulate Mr. Gladstone on its appearance. His elaborate work on the birds of this county having been sold out on publication, the present work comes as a boon to students.

Excursions.

Polbaith Burn and Loudoun Castle, Galston, 20th May, 1911.—Conductor, Mr. John Gloag. The first object of interest visited on this excursion was the great Wych-elm, known as the Boss Tree, of which there is a plate in the *Annals of the Andersonian Naturalists' Society* (Vol. II.). Loudoun Kirk was next visited. In the "Auld Kirkyaird" at this place are the ruins of the original Parish Church of Loudoun. This church is stated to have been erected in 1451. The ruins consist of some roofless crumbling walls and "the auld queir," which has long been used as the burial place of the family of Loudoun. Here the remains of "the good Chancellor"—first Earl of Loudoun and Lord Chancellor of Scotland—were laid. Here also rest the remains

of the gifted and pure-minded Lady Flora Hastings. The course taken by the party next lay along the Polbaith Burn, but time failing, the Glen was not explored, a visit to Loudoun Castle being decided upon. The party was fortunate to meet the Earl of Loudoun, who most kindly took them into the castle and showed them over the principal parts of the building. Outside the castle attention was given to the great Yew Tree, under which articles of the Treaty of Union between England and Scotland were signed by Hew, third Earl of Loudoun, one of the Scottish commissioners for the Union. There is much fine timber at Loudoun, the Spanish Chestnut, Horse-Chestnut, and Lime being well represented. On a wall was seen growing freely in full flower the Balearic Sandwort (*Arenaria balearica*). According to Mr. Arthur Bennett, F.L.S., this plant was found growing on a wall at Moncrieff House, June, 1859, and was the occasion of a very curious correspondence and a most extraordinary article in the *Phytologist* (new series), 1861. During the day 40 species of birds were seen, including 10 summer migrants, of which the Yellow Wagtail (*Motacilla raii*), a pair and a single bird, was perhaps the most interesting. Mr. David Hastings, mentioned in the account of the Glen Water Excursion (*ante* p. 21), says this species is known in the district by the name of "the Yellow Shepherdess." The ornithologists were disappointed at not finding the Chiffchaff (*Phylloscopus rufus*).

Loch Riddon, 25th May, 1911.—Conductor, Mr. Alexr. Ross. A party of twenty-two, composed of members of this Society and members of the Andersonian Naturalists' Society turned out to this excursion; the weather was delightful. The entomologists had an awkward time with the wind till they reached the west shore of the loch, where most of their captures were made. These were not striking, but included *Dicranomyia stigmatica*, Mg., *Molophilus appendiculatus*, Staeg., *M. obscurus*, Mg., *Erioptera fuscipennis*, Mg., *Ephelia submarmorata*, Verr., *Limnophila bicolor*, Mg., *L. nemoralis*, Mg., *Dolichopeza sylvicola*, Curt., *Tipula hortulana*, Mg., *T. lateralis*, Mg., *Rhyphus fenestralis*, Scop., *Leptis scolopacea*, L., *Rhamphomyia sulcata*, Fln., *Platychirus albimanus*, Fab., *P. scambus*, Staeg., *Melanostoma scalare*, Fab., *Syrphus bifasciatus*, Fab., *Mydaea pagana*, Fab.

Spilogaster tetrastigma, Mg., *Hylemyia nigrimana*, Mg. The ornithologists were pleased with their list of fifty species of birds for the day. The Chiffchaff (*Phylloscopus rufus*) was heard by Mr. Galloway shortly after the party left Colintraive, and again by Mr. Pottie on the east side of Loch Riddon. It was at the latter place that it was heard on a former visit of the Society. The Tree-Pipit (*Anthus trivialis*) was also seen and heard by Mr. Galloway. The Willow-wren and the Wood-wren (*Phylloscopus trochilus* and *P. sibilatrix*) were both common. Sheld-Duck (*Tadorna cornuta*) and Red-breasted Merganser (*Mergus serrator*) were seen. Redshanks (*Totanus calidris*) were frequent, but the Curlew (*Numenius arquata*) and Oyster-Catcher (*Hæmatopus ostralegus*) scarce. Nothing of conspicuous rarity was seen among flowering-plants of which fifty-six species were in flower. Mosses were rather a disappointment. Mr. John R. Lee supplies the list appended. A discovery of some interest, however, Mr. Lee says, was made in the occurrence on the Ormidale side of the loch of the Tunbridge Filmy-fern (*Hymenophyllum tunbridgense*). Mosses observed were the following:—*Campylopus flexuosus*, Brid., *Dicranum fuscescens*, Turn., *Barbula revoluta*, Brid., *B. unguiculata*, Hedw., *Ulota crispa*, Brid., *U. phyllantha*, Brid., *Bartramia pomiformis*, Hedw., *Mnium undulatum*, L., *Neckera crispa*, Hedw. (fertile), *Porotrichum alopecurum*, Mitt., *Heterocladium heteropterum*, B. & S., *Hyocomium flagellare*, B. & S., *Eurhynchium piliferum*, B. & S., *E. myurum*, Dixon, *E. rusciforme*, Milde, *Hypnum molluscum*, Hedw., *Hylocomium splendens*, B. & S. (fertile), *H. loreum*, B. & S., *H. triquetrum*, B. & S.

(*CONTINUED.*)

NOTES.

Early Nesting of the Rook (*Corvus frugilegus*).—During my sixteen years' stay at Bellahouston the rooks never have started nest building until the latter days of February and early ones in March. This year they were busy building their nests on 10th February, and the same day the rooks in Camphill Grounds, Queen's Park, were also busy building.—Jas. Whitton, Superintendent of Parks, Glasgow, 27th February, 1912.

The large Silver-Firs (*Picea pectinata*) **at Rosneath.**—We are able, through the kindness of one of our members and a friend of our late esteemed member, Mr. D. R. Somerville, to reproduce a photograph by the latter of "Adam and Eve," as the pair of big Silver-Firs at Rosneath are popularly called (Plate VI.). Mr. John Renwick supplies the following data regarding them:— The two Silver-Firs at Camsail are called by Mr. H. J. Elwes, F.R.S., in *The Trees of Great Britain and Ireland*, page 729, "the champion Silver-Firs of Great Britain, both as regards age and girth." He measured them in September, 1906, and made the largest to be about 110 feet high by 22 feet 7 inches in girth, and the other 105 feet by 22 feet 1 inch. He does not state at what height from the ground the girth was taken. The trunks are very irregular in outline, but the narrowest part within reach in each tree is about 4 feet 6 inches up. The measurements at this height, avoiding excrescences, were, in June, 1912, 22 feet $5\frac{3}{4}$ inches and 21 feet $10\frac{1}{2}$ inches, an increase since June, 1908, of $1\frac{1}{4}$ inches and 1 inch respectively, an annual average of ·31 and ·25 inch.

The height is rather difficult to measure exactly. In 1908 we made it to be 116 feet and 121 feet, thus differing somewhat from Mr. Elwes. In the report of our visit in June, 1908, *Trans.*, Vol. VIII. (N.S.), page 258, it was conjectured that the trees were at least 270 years old. Mr. Elwes states that the Duke of Argyll believes them to have been planted about 1620 or 1630. They would thus be about 290 years old now. Other Silver-Firs in the neighbourhood measure as under, at 5 feet up:—

		Increase in Girth.		Annual
Feet.	Inches.	Inches in	Years.	Average Inch.
16	2	3	4	·75
14	$7\frac{1}{2}$	$\frac{3}{4}$	4	·19
13	$0\frac{1}{2}$	$4\frac{1}{4}$	$8\frac{1}{2}$	·50
12	$9\frac{3}{4}$	$2\frac{1}{4}$	$8\frac{1}{2}$	·27
13	$5\frac{1}{4}$	$5\frac{1}{4}$	$8\frac{1}{2}$	·62

A tree blown down measured 11 feet 11 inches at 5 feet up. 103 rings of growth were counted, showing a girth increase of 1·39 inch annually.

SILVER FIRS *(Picea pectinata)* AT ROSNEATH.

The Glasgow Naturalist

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The Birds of the Parish of Beith and Neighbourhood.

By JOHN CRAIG and MATTHEW BARR.

[Read 24th September, 1912.]

THE area included is confined to a radius of three to four miles from the town of Beith in Ayrshire. The district is well wooded, and includes some high hills. The number of species known to have occurred is 116, and of this number 83, which are distinguished by an asterisk, have bred.

*MISTLE-THRUSH (*Turdus viscivorus*).—A fairly common resident, but we do not think it has increased any in the last forty years. In autumn small flocks may be seen moving about. The nest is generally built in trees, at varying heights of from three to forty feet from the ground. We have seen a nest in an over-grown whin-bush, one on the ground, though there were plenty of trees around, and one in a hedge. Nests are often found about the end of March. It begins to sing in January, continuing till May, and somtimes June. It sings also occasionally in the autumn. It is our loudest songster. In the autumn of 1889 we saw a pure white one with red eyes. It returned in the following spring, and proved to be a female. We found her nest with four eggs. The young birds turned out quite normal. The parent bird was not seen after the autumn of 1890.

*SONG-THRUSH (*T. musicus*).—Abundant. While most of our Song-Thrushes leave us in winter, a few can always be seen in

the hardest weather. The winter of 1878-79 was long and severe, and their numbers in consequence greatly reduced, but they recovered gradually again. Though well named the Song-Thrush, it is more of an orator, pouring forth its notes singly. In mild weather it begins to sing about the end of December, and goes on to July. It sings also in autumn sometimes, and we have known it occasionally to sing on the ground. Sometimes it uses an old blackbird's nest. We have known several nests partly lined with withered grass, and have seen several nests on the ground. Nests with eggs may be found in the third week in March, and on to July. While four or five is the usual number of eggs laid, we have seen a clutch of six and a nest with six young.

Redwing (*T. iliacus*).—Abundant, arriving about the first week in October, and continuing to arrive throughout the month. It may be heard when flying overhead at night, and is more nocturnal than the Fieldfare. Most leave by mid April. They warble in fine days in autumn and winter, and often sing on fine days in April. The song is not so connected as that of the Song-Thrush, which it somewhat resembles however.

Fieldfare (*T. pilaris*).—A common winter visitor, arriving about the third week in October, and departing in April and May. They come and go later than the Redwing. In the last two or three years they have not been so numerous with us as formerly. We have often heard them making a chattering noise as if they were just going to sing, but we have never heard them singing. They roost on trees and on the ground, especially on the latter in stormy weather.

*Blackbird (*T. merula*).—Abundant. The blackbird has a fine song, though we think it inferior to that of the Song-Thrush. It is hardier than the last-named. Sometimes it rears two broods in the same nest. The white and pied blackbirds we sometimes meet with are almost invariably males. We have seen two or three clutches of six eggs and one of seven. We saw a Blackbird sitting on a clutch of eggs on a bare stone wall where the nest had been built. The nest was lying on the ground about a yard from its original position. No doubt the bird was ready to lay when the nest was removed.

*RING-OUZEL (*T. torquatus*).—Used to be fairly common, but the last visit we paid to Kaim Dam, in Lochwinnoch Parish, where we used to find nests many years ago, yielded neither bird nor nest. It has a loud and clear song, but it is inferior to that of the Song-Thrush or Blackbird.

*WHEATEAR (*Saxicola œnanthe*).—Generally arrives about the end of March or the beginning of April, and departs in September and October. It frequents the hilly and stony parts of the parish, and a few pairs may be seen on the lower levels, but it is getting scarce here. It often builds in holes in the the ground and in fissures of rocks, and if the hole is of sufficient length to allow the bird to keep out of reach it will run to the end of the hole and wait till all danger is past. It also builds in dry stone dykes, &c., and will run for some distance in the dyke before making its appearance in the open.

*WHINCHAT (*Pratincola rubetra*).—Generally arrives about the beginning of May, and departs in August and September. It frequents the hilly parts of the parish as well as the more level parts of the district, but it is getting scarcer in this locality. Its pretty song resembles the Whitethroat's, but it varies in individual birds.

*STONECHAT (*P. rubicola*).—Rare. In 1901 we saw two nests with eggs in the parish. Before and since then we saw several pairs in the breeding season.

*REDSTART (*Ruticilla phœnicurus*).—Often seen in passage, especially in autumn, usually young birds. The Redstart has a nice song resembling that of the Chaffinch, finishing with a few warbling notes. The call-notes resembles those of the Willow-Wren. We found a nest with seven young in the parish.

*REDBREAST (*Erithacus rubecula*).—Abundant. This very pugnacious bird selects a piece of ground from which it chases any of its own species attempting to cross the border line. One ascended three stairs in a tenement, and took up its abode with one of the writers, remaining for seven days. We have seen a pied Robin, and one with a white ring round its neck. Among curiosities in Robin's nests, we have seen one in a hedge, five feet from the ground, one in a spruce fir, one in a wash-house, eight

feet from the ground, and another in a flower-box. Twice we have seen clutches of white eggs. It sings in every month of the year, and is most silent in July. We consider that it sings more than any other bird.

*Whitethroat (*Sylvia cinerea*). — One of our commonest migrants, arriving about the first or second week in May. It frequents small plantations as well as the open country, and a few pairs may be seen in the hilly parts of the Parish. We have seen a clutch of six eggs. Mr. Kennedy, Beith, got a clutch of white eggs of this species. One of the writers and Mr A. Stewart saw a Whitethroat's nest built among grass and woven round two grass stems, but the nest was principally supported by the grass, and we have seen one since in a bramble bush, woven round two of the branches, but principally supported by the bush.

*Garden-Warbler (*Sylvia hortensis*).—Scarce. Generally arrives about the second or third week in May. It frequents glens, woods, and enclosures, where there is plenty of cover, and is very timid. It has a very fine song, and although it is scarcely six inches in length the notes are almost as loud as a Blackbird's.

*Golden-crested Wren (*Regulus cristatus*).—Common. It frequents fir plantations, &c. We have found as many as ten nests in one season. We have seen a nest two feet nine inches from the ground, also one twenty-seven feet above the ground. Curiously enough these two nests were in the same plantation, and in the same year, and they are respectively the lowest and highest of the species we have seen, the low one being also the smallest clutch we have ever seen, there being only four eggs in it. Till 1904 all the nests we found were in Spruce Firs, since then we have found three in Yews and one in a Cypress.

*Chiffchaff (*Phylloscopus rufus*).—Rare. We have heard it on the 31st of March, but it generally arrives about the middle of April. The three nests we have seen were about a foot or two from the ground.

Willow-Wren (*P. trochilus*).—Abundant, arriving from 6th April onwards. It is our commonest migrant, and may be heard

pouring forth its nice swinging little song in every part of the parish. We have seen a nest on the root of a fallen tree, and another among Ivy, about three or four feet from the ground.

*WOOD-WREN (*P. sibilatrix*).—Scarce, generally arriving about the second week in May. It frequents glens and woods. We have seen about a dozen nests.

*SEDGE-WARBLER (*Acrocephalus phragmitis*).—Plentiful. This migrant usually arrives about the beginning of May. It was scarce about Beith in 1909, but there was a slight increase in 1910, and a still greater increase in 1911, which has brought them up to about their normal number, but they are not so numerous as they were thirty years ago. The nest is generally built among herbage, about a foot or two from the ground. It is sometimes suspended, and woven on three or four reed stems or grass stems. We have seen a reddish-coloured egg of this species.

*GRASSHOPPER-WARBLER (*Locustella nævia*).—Generally arrives about the beginning of May, but it has been decreasing here of late years. In a plantation near Beith we found sixteen Grasshopper-Warblers' nests, and we have found three elsewhere. We have not found more than five nests in any one year.

*HEDGE-SPARROW (*Accentor modularis*).—Abundant. They generally move about in pairs. The nest is usually built a few feet from the ground, but we saw one on a tree about twelve feet up. We have also seen a nest in a wall. As a rule a Robin chases this species, but we have, on several occasions, seen a Hedge-Sparrow chasing a Robin.

*DIPPER (*Cinclus aquaticus*).—Common. We have seen this species hopping from branch to branch on a tree like one of the thrush tribe. It sings throughout the autumn and winter months and on till May, but it is occasionally heard in summer when the female is off the nest. This is usually built at no great height from the water, but we have seen two nests about thirty feet above the water, and we have seen one in an old quarry where there was stagnant water below.

BRITISH LONG-TAILED TITMOUSE (*Acredula rosea*).—Uncommon. Occasionally seen in small parties in January and November.

*GREAT TITMOUSE (*Parus major*). — Not uncommon. It frequents woods, glens, &c. Its bugle-like notes may be heard

in the early days of January. This bird will kill a Robin and pick its brains out, and if half a dozen are kept in the same cage they will fight till only one is left. One of the writers has seen a nest of this species with nine eggs, in an iron pipe thirteen inches below the surface of the ground.

*Coal-Titmouse (*Parus ater*). — Common, frequenting fir plantations, &c. The male feeds the female both on and off the nest. Of nine Coal-Tits' nests found in one season eight were in holes in the ground and one in a dyke. Nine eggs is the most common clutch in our experience, but we have seen a nest with ten eggs.

*Willow-Titmouse (*P. atricapillus kleinschmidti*). — Not common. It frequents fir plantations, hedges, &c. We watched a pair making a hole in an old decayed stump. The birds carried away the chips, but many chips fell to the ground at the foot of the stump and were left there. A nest was built in the hole of this stump. We visited the nest pretty regularly for about four months, but the female never laid an egg.

Blue Titmouse (*P. cæruleus*).—This active and lively bird frequents plantations, wooded parts, &c. It is a great acrobat, and nests in holes in trees and in dykes.

*Wren (*Troglodytes parvulus*). — Common. A peculiarity about this bird is that many nests made by the male bird are left unfinished. The female selects one and lines it with feathers. We watched one of these nests, and it was six weeks before the female laid an egg in it. The writer saw a Wren's nest in the pocket of an old coat hanging from the branch of a tree. We have seen a nest with young ones as late as 19th August.

*Tree-Creeper (*Certhia familiaris*).—Sparsely scattered over the parish. A few pairs have bred here and there, but the bird is more frequently found in winter.

*Pied Wagtail (*Motacilla lugubris*). — Fairly common in summer, and a few may be seen in winter. It chases the Grey Wagtail, and it often has a tussle with the White Wagtail. We have seen a Pied Wagtail's nest inside a Blackbird's.

White Wagtail (*M. alba*).—Seen in spring and autumn, less frequently in the latter. We saw a vast flock of this species feeding in a ploughed field one spring.

*GREY WAGTAIL (*M. melanope*). — Not uncommon. This graceful and delicately-coloured bird frequents quick-running streams, &c. Unlike the Yellow Wagtail, it seldom visits an open field. We once saw a Grey Wagtail's nest inside an old Dipper's. We have seen nests with eggs of this species in the first week of April.

*YELLOW WAGTAIL (*M. raii*).—Abundant. This beautiful summer visitor generally arrives about the middle of April. Our earliest date for its appearance is 7th April. This was in 1894. It is the commonest Wagtail we have in the breeding season. The nest is sometimes built in a whin bush, or on the face of a hill.

*TREE-PIPIT (*Anthus trivialis*).—Fairly common, generally arriving about the 23rd of April. It frequents plantations and other suitable localities. Although the Tree-Pipit is well adapted for perching on trees, it roosts on the ground. The flight of this bird is undulating, resembling that of the Chaffinch. The flight is a very important point in distinguishing a bird. A side view is the best, as you can see the shape of the bird; a front view is the next best, and a back view the worst. The nest is usually built in or near a wood.

*MEADOW-PIPIT (*A. pratensis*).—Abundant. This species may be seen almost anywhere in the parish, and a few are present with us even in the hardest weather. Sometimes the male feeds the female when off the nest. The Meadow-Pipit sometimes feeds the old Cuckoo. Four or five eggs are usually laid, but we have seen clutches of six twice.

GREAT GREY SHRIKE (*Lanius excubitor*).—A rare winter visitor. One was shot in the neighbourhood in 1891.

*SPOTTED FLYCATCHER (*Musicapa grisola*).—Fairly common. This summer migrant generally arrives about the second week of May. It frequents glens, wooded parts, &c., where there are plenty of flies. It is a very quiet bird. The male sometimes feeds the female on the nest. In 1908 we saw a clutch of five eggs of a very pale-blue colour without markings.

*SWALLOW (*Hirundo rustica*). — Arrives from 7th April onwards. We have never seen it later than 15th October.

There is a widespread belief that when Swallows are skimming over ponds and dipping into the water they are washing themselves. They are really in pursuit of flies on the surface of the water. If the female of this species loses its mate it soon finds another. Two white Swallows have occurred here. Both were killed with a sling. We saw one of them—a young bird. One of the writers has seen a Swallow's nest on the head of a brush.

*House-Martin (*Chelidon urbica*) — This summer visitor usually arrives about the beginning of May. It is scarce as a breeding species, but large flocks may be seen in August and September. The year 1911 was a record one for Swallows and House-Martins here. It was a remarkably fine summer, and migrants left earlier in the autumn than usual that year.

*Sand-Martin (*Cotile riparia*).—Generally arrives about the middle of April. It is scarce as a breeding species, but large flocks are often seen in spring and autumn, though the numbers are less in the latter season. Very few were seen in the spring of 1911.

*Greenfinch (*Ligurinus chloris*).—Abundant. This species may be seen almost anywhere. Nests with eggs may be found about the third week in April and on till the third week in August, and young ones in the nest in the beginning of September; but many of these late nests are forsaken by the parent birds. Like the Canaries they occur both yellow and buff, and cinnamon specimens are sometimes met with. These, as well as those of other species, are almost invariably females. It was considered in Beith, about forty years' ago, that all cinnamon Canaries were females, but that is not the case. It all depends on how they are bred.

*Goldfinch (*Carduelis elegans*).— Rare. This species has nested in the district, and a pair are occasionally seen in the parish.

*House-Sparrow (*Passer domesticus*).—Abundant. We saw a House-Sparrow's nest in a Cypress tree which was only partly domed, with two holes in it for the birds to enter and leave. We believe we were the first to point out that the House-Sparrow sometimes feeds its young ones in instalments, that is, it feeds the same young one twice or three times, or different ones with

the same mouthful of food. We have seen white examples of this species of both sexes. We have also seen several black House-Sparrows. One that was brought to us had a strong smell of soot. Probably the bird had been roosting inside or close to a chimney!

*CHAFFINCH (*Fringilla cœlebs*).—Plentiful. This cheery songster begins to sing about the end of January, and continues till the beginning of July, but it occasionally sings in October. The sexes separate in the winter, and they are principally males that are seen here, but there is always a sprinkling of females. We have seen eggs of a light-blue colour, with reddish spots at the larger end, and light-blue eggs without markings, and eggs like those of the Greenfinch.

*BRAMBLING (*F. montifringilla*).—This beautiful winter visitor has been seen in this district in small numbers. The song is composed of a few notes which resemble those of the Chaffinch, but it is not so good a songster as that bird. It has a shuffling style of hopping like the Chaffinch.

*LINNET (*Linota cannabina*).—Rare. This species was fairly common in this district about twenty-five years ago, since then it has been gradually decreasing. A few may be seen occasionally in the autumn and winter months. It is about twenty-two years since we saw a nest of this species. It is delightful to hear a flock of these birds singing in concert. Five or six eggs are usually laid to the clutch.

MEALY REDPOLE (*L. linaria*).—Small flocks of this winter visitor have been seen along with the Lesser Redpole in the parish. About a dozen were caught in the winter of 1910-11, and one was caught seven years ago. The call note of this species is louder and harsher than that of the Lesser Redpole.

LESSER REDPOLE (*L. rufescens*).—Fairly common. A few nests of this lively little species are annually to be found in the parish, and flocks of about two dozen are often seen in the autumn and winter months. One of the writers has kept several specimens in confinement. These caught and ate flies.

*TWITE (*L. flavirostris*).—Scarce as a breeding species, but flocks may be seen flying about in the winter months. We found

a nest with four young ones. One of the writers took them and put them under a Canary which reared them successfully. They were three males and one female. It was an early brood. As a general rule early broods are mostly males and late broods are mostly females. The eggs vary in number from four to eight.

*Bullfinch (*Pyrrhula europæa*).—Scarce. It has bred in the neighbourhood. Four were caught in the parish in April, 1911. This species also catches flies and eats them in confinement.

*Corn-Bunting (*Emberiza miliaria*).—Scarce as a breeding species, but flocks are occasionally seen in the autumn and winter months. We found a nest with four eggs. There was a hole in the bottom of the nest which appeared to be made by the bird's bill to allow the water to run out of the nest. In the breeding season the bird often flies with its legs hanging as if broken. It seems to be a breeding habit, as the bird does not do this in the autumn and winter months.

*Yellow Bunting (*E. citrinella*).—Abundant. There has been much discussion as to the number of eggs this species lays to the clutch. Our experience is there are more threes than fours, although four is quite a common number, but five is unusual. The first nest we found with five was in 1897, one in 1900, and another in 1903, and Mr. R. Kennedy found one in 1906, three years between each of the nests. The male takes part in incubation.

*Reed-Bunting (*E. schœniclus*).—Plentiful. We have seen a Reed-Bunting's nest beneath a piece of old shoe. We also found a nest with three eggs. One of the eggs was white, another was the usual colour, but abnormally large, with a double yolk, and the third was of the usual size and colour. This nest was suspended among reeds, but not interwoven in the stems. The male takes part in incubation.

Snow-Bunting (*Plectrophenax nivalis*).—A winter visitor, but very irregular in its appearance.

Starling (*Sturnus vulgaris*).—Abundant. From the *Western Supplement*, Beith, of 1st April, 1911, we take the following:—"An old tree, considered a landmark, which reared itself aloft in

a garden at the Horseshoe, has disappeared before the remorseless advance of the builder. It is stated by the oldest residenters that in its branches was reared the first brood of Starlings seen in this parish, some seventy or eighty years ago. The Starling was a *rara avis* in those days, and people congregated daily to watch the strangers as they brought the young birds to maturity. The nest was in a box in the tree, fitted up for their reception. How the species has multiplied since then can be seen in late summer by the myriads of birds which flock in different parts of the district." We knew of a Starling's nest in a hole in the ground, and also saw one on the ground which was covered by a box, the birds entering and leaving the nest through a hole in the box. We have seen one in a gas lamp, one in a coal house, several in haystacks, and others on trees, open to the sky, like a Blackbird's. There is a breeding place about two miles from Beith, and every time we visit the spot during the time the birds are rearing their young there are about a dozen young birds, about half grown, lying dead on the ground. We think there must be some disease among them. The nests are very close together. Sometimes Starlings roost with Rooks, but the latter object to their company. Probably they dislike the chattering noise of these little fellows. Some years ago a flock of Rooks were roosting at the manse. The Starlings followed them several times from the Manse to Morrishill, but the Rooks had to submit to the inevitable and give up their roosting place. White examples are sometimes met with. We saw one about Beith a few years ago, and Mr. A. Stewart and one of the writers saw another white one on 7th October, 1911.

*MAGPIE (*Pica rustica*).—Fairly common, but its numbers depend largely on gamekeepers. Though the bird is cunning enough to keep out of reach of the sportsman's gun, when the nesting season comes round gamekeepers soon reduce their numbers by shooting them on the nest or when rising from it. The Magpie is an ornament to the landscape. A few years ago a gentleman, who resided in Beith, while taking a walk, saw a Pyet following a Skylark to its nest, which contained young ones. The Magpie seized one of the young Larks in its beak and flew away with it. The gentleman referred to followed the Pyet, and

when he got near it, it dropped the young bird, but it had nearly all the feathers pulled out of its victim. In 1905 we saw a flock of sixteen. The Magpie builds the largest domed nest we are acquainted with.

*Jackdaw (*Corvus monedula*).—Plentiful, but comparatively scarce as a breeding species. We saw a curious coloured specimen of this species with some white feathers in it, and it had pink eyes.

Carrion-Crow (*C. corone*).—Sparsely scattered over the parish. Our experience is that from two to six "caws" are uttered by this species, three being most frequent.

Hooded Crow (*C. cornix*).—Occasionally seen in the neighbourhood.

*Rook (*C. frugilegus*).—Abundant. We have seen two nests of this species built in a chimney, although there were plenty of trees close by. One of the writers kept a young Rook for some time in confinement for the purpose of testing whether the feathers at the base of the bill were worn off by the bird boring in the ground for food, or whether it was the result of a moult, but the bird was infested with vermin so it got its liberty. Our opinion is that the feathers disappear at the moult not to be resumed again. Young birds may be seen in November with the feathers at the base of the bill, and sometimes later. Jackdaws feed in similar places to the Rook, but they do not lose the feathers at the base of the bill by boring in the ground for food. All the Rooks about this locality roost about "the Caldwell" throughout the winter months.

Sky-Lark (*Alauda arvensis*).—Plentiful in summer. In winter large flocks are often seen. The song of this bird is eminently harmonious. It sings from February to July, resuming for a short time at the end of September or in October. We timed one which sang for forty-two minutes before alighting. We have also heard several singing for thirty minutes, but from ten to fifteen minutes is the usual time. We can tell whether the bird is ascending or descending without looking at it by the different style of the song. The Sky-Lark often perches on the top of a whin bush or a hedge, and sometimes on young trees, but it

seldom perches on a tree of any great height. We saw one perched on a tree about fifteen feet high, and one on a tree about twenty feet high, and it even perches on the ridging of a house when its young ones are in a cage hung on the side of a wall. There has been much discussion as to the number of eggs this species lays to the clutch. Our experience is there are more fours than threes, although three is quite a common number, but five is unusual. We have seen two nests on the roadside, one in a young plantation, and two under a whin-bush.

*SWIFT (*Cypselus apus*). — Not uncommon. This summer visitor generally arrives about the first week in May. The majority take their departure about the middle of August, but we have seen them in September. They spend most of their time wheeling through the air catching flies. They are almost tireless on the wing, and we have never seen them perched. Owing to their long wings and short legs they can hardly rise from a flat surface. We experimented with four birds but three of them failed to rise, as they always closed their wings when attempting to rise. The other one kept its wings spread out and gradually rose up.

KINGFISHER (*Alcedo ispida*).—Scarce. We have seen two nests in the district. One that we saw fishing drew the captured fish through its bill crosswise, from head to tail and from tail to head, as if breaking its bones before swallowing it.

CUCKOO (*Cuculus canorus*).—Not uncommon. In 1889 we made our first experiment with a young Cuckoo about three days old, by putting in a House-Sparrow's egg into a Meadow-Pipit's nest, when the young Cuckoo, while still blind, hoisted the egg on its back and climbed up the side of the nest backwards and threw it out. Ten years later we got Mr. Peat Millar, Beith, to take a series of snap-shots of a young Cuckoo, while still blind, ejecting a young bird from the nest. These we believe to have been the first photographic records of this curious fact taken in this country.

BARN-OWL (*Strix flammea*).—Scarce. Mr. A. Stewart and one of the writers saw a clutch of six Barn-Owls in a dovecote in the district. Three were larger than the others and left the nest earlier.

*Long-eared Owl (*Asio otus*).—Fairly common, nesting in many of the fir plantations in the parish. We have never seen it flying from one plantation to another in broad daylight, although often to be seen moving about in a plantation with other birds in pursuit.

*Tawny Owl (*Syrnium aluco*).—Scarce. This species has nested in the parish and neighbourhood. We saw a pair that came down the chimney of a cottar's house on Millbank Farm, in Lochwinnoch Parish, during the severe winter of 1894-5, and were promptly killed by the inmates, but not before they had destroyed some stuffed birds that were in the room, pouncing on them, and tearing them to pieces, doubtless thinking they were flesh and blood. They must have been greatly surprised when they found nothing but feathers and wool. This proves that birds of prey find their food by sight, not by smell, as some people think. The intruders now fill the places of the birds then destroyed, and were set up by the local taxidermist at Lochwinnoch.

*Sparrow-Hawk (*Accipter nisus*).—Scarce. It nests in small numbers in different parts of the parish. We have seen eggs of this species resembling those of the Partridge in colour.

Merlin (*Falco æsalon*).—Rare. A young bird in brown plumage was shot in 1910.

*Kestrel (*F. tinnunculus*).—Scarce in the breeding season, more frequent in winter. One flew through an open window in a house in Beith and attempted to seize a canary in a cage. It was captured. We have seen this species pursuing a Blackbird and a Skylark, but it had to give up the chase.

Cormorant (*Phalacrocorax carbo*).—One was shot in one of the Beith Reservoirs, and it is sometimes seen in Kilbirnie Loch.

Common Heron (*Ardea cinerea*).—Not common.

Grey Geese (*Spp. ?*).—Grey Geese have been seen occasionally, but have not been specifically identified.

*Canada Goose (*Anser canadensis*).—This species is common in the neighbourhood, and has bred in the parish.

*Mute Swan (*Cygnus olor*).—Sometimes met with in the parish, and breeds in the neighbourhood, but in considerably reduced numbers.

*MALLARD (*Anas boscas*).—A few pairs breed in the parish and their numbers are augmented in the winter. One of the writers saw a white specimen which he took to be a female of this species. It was shot when flying along with some other Ducks, and the same writer saw another white specimen alive (male) about the same place, in 1912. There were seven white ones caught when young, but six of these died or disappeared. The Mother was also white.

*TEAL (*Nettion crecca*).—Not uncommon. A few pairs breed in the parish.

WIGEON (*Mareca penelope*).—Common from autumn to spring.

POCHARD (*Fuligula ferina*).—Not so common. Occurring sometimes till May.

*TUFTED DUCK (*F. cristata*).—Common. This species has bred in the district and has increased of late years here.

SCAUP DUCK (*F. marila*).—Sometimes seen.

GOLDENEYE (*Clangula glaucion*). — Is met with in small numbers in winter.

GOOSANDER (*Mergus merganser*).—Frequently seen in winter in small numbers.

STOCK-DOVE (*Columba œnas*).—One was shot on 8th April, 1907, at Hessilhead Castle.

*RINGDOVE (*Columba palumbus*).—Common. Builds in most of our fir plantations. We found a nest of this species with four eggs. Probably two females had laid in the same nest. There seemed to be a struggle for possession of the nest, for the next time we visited it some of the eggs were lying broken at the foot of the tree.

*BLACK GROUSE (*Tetrao tetrix*).—Not uncommon, and breeds in Kilbirnie and Lochwinnoch Parishes.

*RED GROUSE (*Lagopus scoticus*).—Plentiful.

*PHEASANT (*Phasianus colchicus*).—Common. We have found nests in the hilly parts of the parish where we hardly expected to find them,

*COMMON PARTRIDGE (*Perdix cinerea*).—Plentiful. We found a Partridge's nest with two Pheasant's eggs in it.

*Corncrake (*Crex pratensis*).—Common. This summer visitor generally arrives here about the last week in April. We have seen a Corncrake perched on the top of a hedge uttering its well-known note. The eggs vary in number from seven to eleven, sometimes more, but nine and ten are the most common clutches. We have seen a Corncrake's nest with nineteen eggs at the back of a farm-house among nettles; probably two females had laid in this nest.

Baillon's Crake (*Porzana bailloni*).—One was got in May, 1893, which had been killed by coming in contact with the telegraph wires.

*Water-Rail (*Rallus aquaticus*).—Not common, but occasionally seen and has bred in the district.

*Moor-Hen (*Gallinula chloropus*).—Plentiful.

*Coot (*Fulica atra*).—Common.

Ringed Plover (*Ægialitis hiaticola*).—Sometimes seen by the side of the Beith Reservoir and Kilbirnie Loch in spring and autumn.

*Golden Plover (*Charadrius pluvialis*).—This species has bred in the parish. It may be seen feeding in grass fields, especially where horses are grazing, and moving about in flocks of twenty to fifty or more in open weather from autumn to spring.

*Lapwing (*Vanellus vulgaris*).—Abundant. The Peewit begins to lay about the last week in March. The eggs are usually four in number, but we have seen clutches of three and five. We have taken fresh eggs on 13th June. The well-known notes of the Lapwing may be heard about the beginning of March. They appear to us to resemble "Willopo weep, weep-weep." The bird always turns on its side before uttering the last note. These notes proceed from the male only, and while the bird is on the wing. They are never uttered while the bird is on the ground, at least that is our experience. The male may be distinguished from the female, even at a considerable distance, by its darker upper parts, and it rises with a heavier flap. These distinctions only refer to the breeding season. We have seen a Lapwing (♂) with a good deal of white on its wings, and

Mr. A. Stewart and one of the writers saw one which resembled a mottled pigeon. A flock of Lapwings may be distinguished on a clear day at a distance of half a-mile or more with the naked eye by their formation. They stay here throughout the winter if the weather be mild and open, but if a long spell of hard frost sets in they migrate further south.

OYSTER-CATCHER (*Hæmatopus ostralegus*).—Sometimes seen moving about, also sometimes heard passing overhead at night.

*WOODCOCK (*Scolopax rusticula*).—Not common. Seen more frequently in the winter months. We found a nest with five eggs in the plantation we call the "Strip," and another was seen in Brownmuir Wood. Also breeds in Calder Glen, Lochwinnoch.

*COMMON SNIPE (*Gallinago cœlestis*).—Plentiful. We have seen this species perched on a crossbar which supports the telegraph wires. The Snipe sometimes produces the bleating sound and the "Chip, chip" note at the same time. The latter is produced by the vocal organs, which proves that the drumming sound is not produced by the vocal organs, as some people think. This species has been seen feeding its young.

JACK SNIPE (*G. gallinula*).—Some visit us in the winter.

*DUNLIN (*Tringa alpina*).—A few pairs breed annually in the parish. Small flocks of from four to eight are often seen in the spring, and single birds are occasionally met with in the winter. The writers have seen the Dunlin following the Golden Plover.

COMMON SANDPIPER (*Totanus hypoleucus*).—Plentiful, generally arriving about the middle of April. We have seen several nests of this species in plantations. It begins to lay about the middle of May. It often rises off the nest, and moves away very quietly.

*COMMON REDSHANK (*T. calidris*).—Common. This species has increased of late years here. It usually lays four eggs to the clutch, but sometimes five are found.

GREENSHANK (*T. canescens*).—Sometimes seen in the neighbourhood. One year it was seen at the Kaim Dam, Lochwinnoch, in in the breeding season.

*CURLEW (*Numenius arquata*).—Fairly common. This species breeds annually in the parish. It is often heard in March

passing overhead at night. The male either takes part in incubation or the female whistles as well as the male, as we flushed a bird from the nest which whistled like the male.

Whimbrel (*N. phæopus*).—Occasionally seen and heard during the autumn migration.

Common Tern (*Sterna fluviatilis*).—This species is often seen flying about the Beith Reservoirs in the summer months, but there is no evidence that it has ever bred in the district.

Black-Headed Gull (*Larus ridibundus*).—Fairly common. There was formerly a colony at Barcraig Meadows, but they have since left that locality.

Common Gull (*L. canus*).—This species is sometimes met with in the parish.

Herring-Gull (*L. argentatus*).—Common. Often seen in flocks in winter, and a few may be seen in summer.

Lesser Black-backed Gull (*L. fuscus*).—Not common. Is frequently seen in small numbers from about the end of March till September, and sometimes later. It is much less numerous than the Herring-Gull.

Kittiwake Gull (*Rissa tridactyla*).—One was found dead in September, 1909, near Kilbirnie Loch.

Puffin (*Fratercula arctica*).—One seen by us flying over Kilbirnie Loch.

Little Grebe (*Podicipes fluviatilis*).—Fairly common. The nest is sometimes built on the ground, and the young ones are fed by the parent birds for a month or more after the young ones leave the nest.

Storm-Petrel (*Procellarica pelagica*).—Two were heard at night at Powgree Burn in 1889, and one was seen a few days afterwards at the same burn. The call note of this species is quite different from that of the Fork-tailed Petrel, as we heard the call notes of both species.

Fork-tailed Petrel (*Oceanodroma leucorrhoa*).—One was picked up exhausted in a field near Beith, on 20th September, 1899, and we have seen other two in the district.

Further Notes on the Aquatic Coleoptera of the Monklands (Lanarkshire).

By WM. J. M'LEOD.

[Read 26th March, 1912.]

IN February, 1910, I submitted to the Society a list (Vol. II., page 78) of the water-beetles of the Monklands, in which I recorded 40 species representing 11 genera. Continuing my observations on this interesting group from February, 1911, till January, 1912, I have now to add 13 species (distinguished in Table I. attached, by an asterisk) to those already recorded, making the total 53. In my 1910 list the record for *Agabus affinis*, Pk., should be removed owing to a mistaken identification, the species having been confounded with *A. unguicularis*, Th., which should now be substituted for it.

My attention being directed to the useful work done on the group by Mr. Frank Balfour-Browne, M.A. (Oxon), F.Z.S., in the Norfolk Broads Dist.,* I was prompted to adopt a more systematic method in my last season's collections, with a view of getting together some facts as to the appearance, distribution, and habits of the group. The better to enable me to do this work, I have restricted my collecting area from Bishop Loch on the west to Whiterigg on the east, and from the Monkland Canal on the south to Woodend Loch on the north.

This slight alteration on my collecting area accounts for the absence in these notes of such species as *Brychius elevatus*, Panz., *Deronectes depressus*, F., *D. duodecimpustulatus*, F., *Hydroporus septentrionalis*, Gyll., which were recorded for the Clyde and Calderwater, Coatbridge, in my previous records. These species seem to associate themselves with the larger streams and rivers, as I have never found them in small streams or ditches, having only once taken a specimen of *D. depressus*, F., at the sluice which regulates the water supply from Woodend Loch to the Bishop Loch.

I commenced my collecting in February, 1911, selecting ponds, ditches, and running streams within the area, including Bishop

**Norfolk Society's Transactions*, 1904-1909, page 58 and page 290.

Loch, Woodend Loch, and Lochend Loch, with the ditches running into and from them. By visiting the different collecting places as often as I could every month till January of this year, and keeping a list of the different species taken at the collections, I was able to make a comparison of the collections at different places. By this means some little knowledge was gained as to the distribution of the different species within the district, and what sort of habitat was most suited to the different species.

By working out from the monthly collections the total number of species taken each month, we can arrive at the rise and fall in species per month, and I have prepared a chart showing these results (Chart 1). I have also prepared a chart based on the average number of species per collection each month (Chart 2).

I should like to make it clear that these monthly comparisons should be taken provisionally, as equal numbers of collections were not made each month, some of the collecting places having been visited oftener than others. For instance, owing to the very dry season some of the collecting places were completely dried up, with the result that during the months of August and September fewer collections were made, which will probably account for the very low number of species in these months. However, if we take the results shown in Chart 1 as an indication of the probable number of species occurring each month, they may prove useful in determining which months are best suited for the occurrence of these insects within the area, and, when accompanied with Chart 2 showing the number of species per collection each month, a knowledge of the distribution of the species within the area each month is gained.

In connection with the drying up of some of the collecting places during the season, the interesting fact emerged that the beetles found in a certain locality do not take to another locality when the pond or ditch in which they were found gets dried up. One of my collecting places was a ditch in Drumpellier Policies which was within two or three yards of a deep pool. The ditch gets completely dried up in the summer months, while I have never seen the pool dry. The ditch yields such species as *Hydroporus nigrita*, F., and *H. memnonius*, Nic., while the deep pool is the home of *H. incognitus*, Shp. I have taken an odd specimen of

H. incognitus in the ditch, but have never taken either *H. nigrita* or *H. memnonius* in the pool, even when the ditch was completely dry, although the distance separating the one from the other is only two or three yards. A somewhat similar observation was made with *Hydroporus melanarius*, Stm., which occurs in a few sphagnum ditches which are all connected with a deep peaty pool. The pool and ditches might cover an area of about 40 square yards. During the dry season the ditches get completely dried up, while the pool has always some water in it. One might naturally come to the conclusion that the beetle would take to the pond on the drying up of the ditches, but this is not the case, as careful dredging and observation failed to yield a specimen. I am not prepared to say what may be the determining factors which prevent these species from taking to the ponds when the ditches are dried up. Perhaps the depth of water in the pond may have some bearing on the question, but more careful observation would require to be made before arriving at a conclusion.

As the physical conditions and variety of habitat within the area must influence the distribution and occurrence of certain species, a short review of the different kinds of collecting places might be interesting. The Bishop Loch, which yields such species as *Hydroporus umbrosus*, Gyll., *Rhantus exoletus*, Forst., *Agabus unguicularis*, Th., and *A. femoralis*, Pk. (the only locality for this species), has a muddy bottom, thickly overgrown with grass and reeds, especially at the south-west end, which is the most suitable place for dredging, along the sides being very shallow with little shelter for beetles; Woodend Loch, which has a stony and gravelly bottom, produced five species of *Haliplus*:—*H. confinis*, Steph., *H. flavicollis*, Stm., *H. fulvus*, F., *H. ruficollis*, De G., and *H. nomax*, Browne. Woodend is the only locality where I have taken *H. flavicollis*. Lochend Loch, which is bordered on the south by a peat moss, while the north side has a gravelly bottom, is very rich in species, *Hydroporus vittula*, Er., *H. umbrosus*, Gyll., *H. angustatus*, Stm., *Agabus unguicularis*, Th., *Haliplus nomax*, Browne, and *H. wehnckei*, Gerh., being examples of the fauna found on the south side, while *Hydroporus erythrocephalus*, L., *H. pubescens*, Gyll., *H. planus*, F., *Haliplus*

fulvus, F., and *H. ruficollis*, De G., are also found on the north side. Other collecting places in Coatbridge and Whiterigg are peat holes in Drumpellier and Dalmacoulter Mosses, which contain the usual peat pool species, such as *Hydroporus gyllenhali*, Schiöd., *H. tristis*, Pk., *H. morio*, Dj., *H. obscurus*, Stm., *H. melanarius*, Stm., *Agabus sturmii*, Gyll., *A. arcticus*, Pk., and *Ilybius œnescens*, Th. *H. melanarius* I have usually found in very shallow sphagnum pools and ditches in company with *H. gyllenhali*, while the others occur in the deeper pools, also, of course, in company with *H. gyllenhali*. *Ilybius œnescens* did not occur in any of the collecting places at Drumpellier but at two of the Dalmacoulter localities. The difference in elevation may account for this, Drumpellier being about 266 feet above sea-level, while Dalmacoulter is about 639. In my 1910 list I recorded *Agabus congener*, Pk., for this locality when I took a few specimens in company with *Ilybius œnescens*, Th., but I have failed to turn it up this season. The other collecting places at Whiterigg are ponds which had at one time been used to supply water for boilers at coal pits, several clay holes formed where the clay had been excavated, and several patches of low-lying ground where water accumulates but which often become dry during the summer. There are several localities of this type all over the area. The old pit ponds yield *Agabus unguicularis*, *Hydroporus planus*, F., *H. pubescens*, Gyll., *Ilybius fuliginosus*, F., and a single specimen of *Agabus chalconotus*, Pk., while in one large pond I took *Haliplus nomax*, Browne. Although the fauna of the clay holes is somewhat similar to the pit ponds, I have taken, in addition, *Deronectes assimilis*, Pk., *Haliplus confinis*, Steph., *H. wehnckei*, Gerh., and a single specimen of *H. obliquus*, F. The grassy ponds and ditches formed in low-lying ground generally yield such species as *Hydroporus memnonius*, Nic., *H. nigrita*, F., *Rhantus exoletus*, Forst., and *R. bistriatus*, Berg. The remaining collecting places were running streams and ditches. In several slow-running ditches *Agabus paludosus*, F., and *Hydroporus discretus*, Fair., occurred, while in faster-running streams with a gravelly bottom *Agabus guttatus*, Pk., *Hydroporus davisii*, Curt., and *H. rivalis*, Gyll., were met with. *Platambus maculatus*, L., and *Hydroporus ferrugineus*, Steph., occurred in

both. I have also found *A. guttatus*, in company with *A. sturmii*, Gyll., in mossy ditches, but never in company with *A. paludosus*.

From these observations regarding the occurrence of particular species in certain localities, one may conclude that there is some determining factor present in these localities which is of special value to the species concerned. From this general survey of the species usually found in the different localities we may get a knowledge of the associations of the species according to their occurrence in certain habitats, but in a district like that under consideration, where the different habitats so often merge into one another, it would be very difficult to arrange the associations on these grounds.

To show exactly which species I have found associated with each other within the area, I have prepared a table from my collections (Table 1). In this table I have numbered the species, and the numbers are repeated at the heads of the columns, so that each species has a line and a column to itself. By taking the numbers at the head of the column corresponding to the number opposite any species the associations of that species can be traced by referring to the crosses in the line.

From the complete list of the collections, numbering 179, I have worked out how often each species has occurred, and the percentage of occurrence is shown at the end of the line opposite each species in Table 1. From these percentages of occurrences of the different species, we learn which species are most common in the district. The results may be claimed to be important, as they depend upon actual statistics, and not upon any casual impression the occurrence of a species may make.

I should like to take this opportunity of thanking Mr. Frank Balfour-Browne, M.A. (Oxon.), F.Z.S., who has kindly rendered me valuable assistance in verifying or identifying any doubtful species in the list.

CHART 1.—Curves showing Number of Species Occurring each Month.

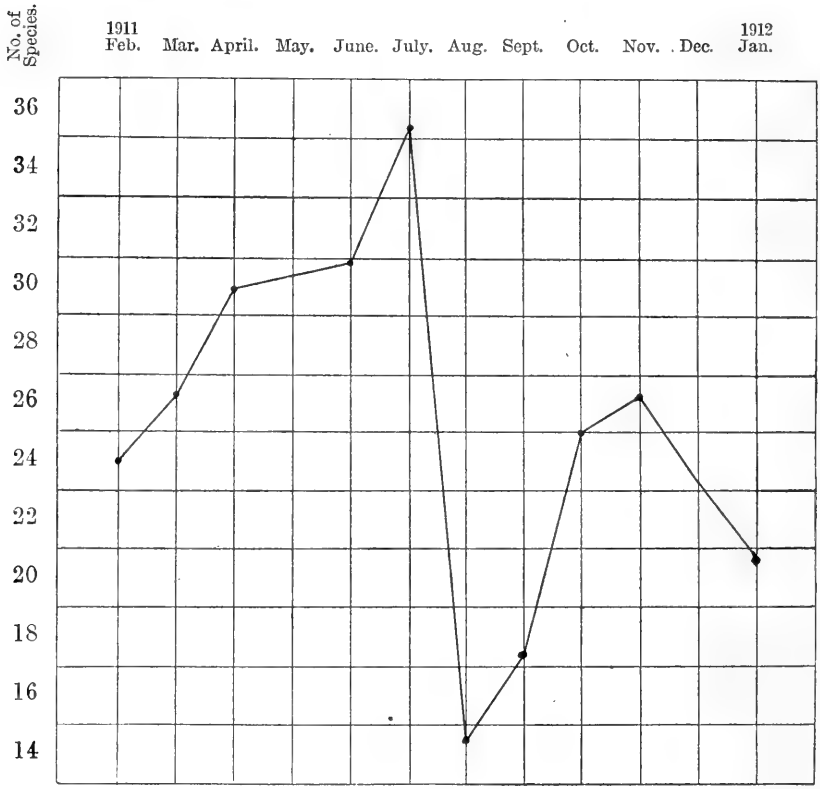
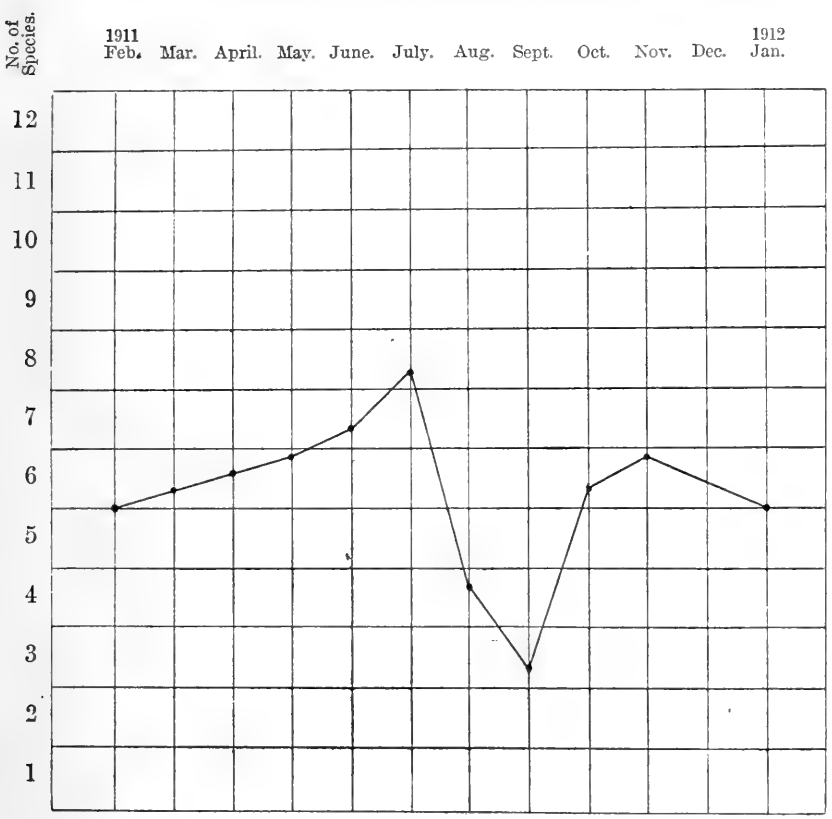


CHART 2.—Curves showing Average Number of Species per Collection each Month.



		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
*Haliplus obliquus, *F.*, - -	1	...	×	...	...	×	...	...	...	×	...	...	...	...	...	...	...	...	×	...	×
,, confinis, *Steph.*, - -	2	×	...	×	×	×	×	×	...	×	...	...	...	...	...	...	...	...	×	...	×
,, flavicollis, *Stm.*, - -	3	...	×	...	×	...	...	...	...	...	...	...	...	...	...	..	...	...	×	...	×
,, fulvus, *F.*, - - -	4	...	×	×	...	×	×	×	...	...	...	...	×	×	×	×	...	×	×	...	×
,, ruficollis, *De G.*, - -	5	×	×	...	×	...	×	×	×	×	...	...	×	×	×	×	...	×	×	×	×
* ,, wehnckei, *Gerh.*, - -	6	...	×	...	×	×	...	...	...	×	...	...	...	...	...	...	...	...	×	...	×
* ,, nomax, *Browne*, - -	7	...	×	..	×	×	...	...	...	...	...	...	...	...	...	...	...	...	×	...	×
,, lineatocollis, *Marsh.*, -	8	...	...	...	...	×	...	...	...	...	...	...	...	...	...	...	...	...	×	×	×
Deronectes assimilis, *Gyll.*, -	9	×	×	...	...	×	×	..	...	...	...	...	...	...	...	...	...	...	×	...	×
Hydroporus rivalis, *Pk.*, - -	10	...	...	...	...	...	...	...	...	...	...	×	...	...	...	...	...	...	...	...	...
* ,, davisii, *Curt.*, -	11	...	...	...	...	...	...	...	...	...	×	...	...	...	...	...	...	...	...	...	...
* ,, tristis, *Pk.*, - -	12	...	...	...	×	×	...	...	...	...	...	...	...	×	×	×	×	×	×	...	×
* ,, umbrosus, *Gyll.*, -	13	...	...	...	×	×	...	...	...	...	...	...	×	...	×	×	...	×	×	...	×
* ,, angustatus, *Stm.*, -	14	...	...	...	×	×	...	...	...	...	...	...	×	×	...	×	...	×	×	...	×
,, gyllenhali, *Schiöd.*, -	15	...	...	...	×	×	..	...	...	...	...	...	×	×	×	...	×	×	×	×	×
* ,, morio, *Dj.*, - -	16	...	...	...	...	...	...	...	...	...	...	...	×	...	...	×	...	...	×	...	×
,, vittula, *Er.*, - -	17	...	...	...	×	×	..	...	...	...	...	...	×	×	×	×	...	...	×	...	×
,, palustris, *L.*, - -	18	×	×	×	×	×	×	×	×	×	...	...	×	×	×	×	×	×	...	×	×
* ,, incognitus, *Shp.*, -	19	...	...	...	...	×	...	...	×	...	...	...	...	...	...	×	...	...	×	...	×
,, erythrocephalus, *L.*,	20	×	×	×	×	×	×	×	×	×	...	...	×	×	×	×	×	×	×	×	...
* ,, melanarius, *Stm.*, -	21	...	...	...	...	...	...	...	...	...	..	...	...	...	...	×	×	...	...	...	...
,, memnonius, *Nic.*, -	22	...	...	...	...	×	...	...	...	...	...	...	...	...	..	×	...	...	×	×	×
* ,, obscurus, *Stm.*, -	23	...	...	...	...	...	...	...	...	...	...	...	×	...	...	×	×	...	×	...	×
* ,, nigrita, *F.*, - -	24	...	...	...	...	×	...	...	...	...	...	...	...	...	...	×	...	...	×	×	×
* ,, discretus, *Fair.*, -	25	...	...	...	...	...	...	...	×	...	...	...	...	...	×	...	...	...	×	×	...
,, pubescens, *Gyll.*, -	26	×	×	...	×	×	×	×	...	×	...	...	×	×	×	×	×	×	×	×	×
,, planus, *F.*, - -	27	×	×	...	×	×	×	×	...	×	...	...	×	×	...	×	...	×	×	×	×
,, ferrugineus, *Steph.*,	28	...	...	...	...	...	...	...	×	...	×	×	...	...	...	...	...	...	×	...	...
Agabus guttatus, *Pk.*, - -	29	...	...	...	...	...	...	...	×	...	×	×	...	...	...	...	...	...	×	...	×
,, paludosus, *F.*, - -	30	...	...	...	...	...	...	...	×	...	...	...	...	...	×	...	...	...	×	×	...
,, unguicularis, *Th.*, - -	31	...	...	...	×	×	...	×	...	...	...	...	×	×	×	×	...	×	×	...	×
,, nebulosus, *Forst.*, - -	32	...	...	...	×	×	...	...	×	...	...	...	×	...	...	×	×	×	×	...	×
,, femoralis, *Pk.*, - -	33	...	...	...	...	...	...	...	...	...	...	...	...	×	...	...	...	...	×	...	..
,, arcticus, *Pk.*, - -	34	..	...	...	...	×	...	...	...	...	...	...	...	...	...	×	×	...	×	...	×
,, sturmii, *Gyll.*, - -	35	×	×	...	×	×	×	×	...	×	...	...	×	×	...	×	×	...	×	×	×
,, chalconotus, *Panz.*, -	36	...	...	...	×	×	...	×	...	...	...	...	...	...	...	...	...	...	×	...	...
,, bipustulatus, *L.*, - -	37	×	×	...	×	×	×	×	×	×	...	...	×	×	×	×	×	×	×	×	×
Platambus maculatus, *L.*, - -	38	...	...	...	...	...	...	...	×	...	×	×	...	×	...	...	...	...	×	×	...
Ilybius fuliginosus, *F.*, - -	39	...	...	...	×	×	...	×	×	...	...	...	...	...	...	...	...	×	×	×	...
,, ater, *De G.*, - - -	40	...	...	..	...	×	...	...	...	...	...	...	×	...	...	×	×	...	×	...	×
,, ænescens, *Th.*, - -	41	...	...	...	×	×	...	...	...	...	...	...	...	...	...	×	...	...	...	×	...
Rhantus exoletus, *Forst.*. - -	42	...	...	...	×	×	...	...	...	...	...	...	...	...	...	...	...	...	×	×	×
,, bistriatus, *Berg.*, - -	43	...	...	...	×	×	...	...	...	...	...	...	...	...	...	...	...	...	×	...	...
Colymbetes fuscus, *L.*, - -	44	...	...	...	×	×	...	...	...	...	...	...	...	×	...	×	×	...	×	...	×
Dytiscus punctulatus, *F.*, - -	45	...	...	...	×	×	×	×	×	×	...	...	×	×	×	×	×	×	×	×	×
,, marginalis, *L.*, - -	46	...	...	...	×	×	...	...	×	×	...	...	...	×	×	×	...	×	×	...	×
Acilius sulcatus, L. var. scoticus, *Curt.*,	47	...	...	...	...	...	...	...	...	...	...	...	...	×	...	×	×	...	×	...	×
,, fasciatus, *De G.*, - -	48	...	...	...	...	...	...	...	...	...	...	...	...	...	...	×	...	...	×	...	×

21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Percentage of occurrences in Total Collections.	
...	...	...	...	...	×	×	...	...	...	...	...	...	...	×	...	×	...	...	...	...	...	...	...	...	...	...	...	·55	1
...	...	...	...	...	×	×	...	...	...	...	...	...	...	×	...	×	...	...	...	...	...	...	...	...	...	...	...	2·23	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2·23	3
...	...	...	...	...	×	×	...	...	...	×	×	...	...	×	×	×	...	×	...	×	×	×	×	×	×	...	...	13·40	4
...	×	...	×	...	×	×	...	...	...	×	×	...	×	×	×	×	...	×	×	×	×	×	×	×	×	...	...	18·99	5
...	...	...	...	...	×	×	...	...	...	...	...	...	...	×	...	×	...	...	...	...	...	...	...	×	...	...	...	1·11	6
...	...	...	...	...	×	×	...	...	...	×	...	...	...	×	×	×	...	×	...	...	...	...	...	×	...	...	...	1·67	7
...	...	...	...	×	...	...	×	×	×	...	×	...	...	...	...	×	×	×	...	...	...	...	...	×	×	...	...	10·61	8
...	...	...	...	...	×	×	...	...	...	...	...	...	...	×	...	×	...	...	...	...	...	...	...	×	×	...	...	2·79	9
...	...	...	...	...	...	...	×	×	...	...	...	...	...	...	...	...	×	...	...	...	...	...	...	...	...	...	...	1·11	10
...	...	...	...	...	...	...	×	×	...	...	...	...	...	...	...	...	×	...	...	...	...	...	...	...	...	...	...	1·11	11
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...	...	...	...	...	×	×	...	...	...	×	...	×	...	×	...	×	×	...	...	...	...	...	×	×	×	×	...	10·05	13
...	...	...	...	×	×	...	...	...	×	×	...	...	...	...	...	×	...	...	...	...	...	...	...	×	×	...	...	4·46	14
×	×	×	×	...	×	×	...	...	...	×	×	...	×	×	...	×	...	...	×	×	...	...	×	×	×	×	×	41·34	15
×	...	×	...	...	×	...	...	...	...	...	×	...	×	×	...	×	...	...	×	...	...	...	×	×	...	×	...	8·93	16
...	...	...	...	...	×	×	...	...	...	×	×	...	...	...	...	×	...	×	...	...	...	...	...	×	×	...	...	7·26	17
...	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	...	×	×	^	×	×	×	×	57·54	18
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...	×	×	×	...	×	×	...	×	...	×	×	...	×	×	...	×	...	...	×	...	×	...	×	×	×	×	×	36·87	20
...	...	...	×	...	×	...	...	...	...	...	...	...	...	...	...	×	...	...	...	...	...	...	...	...	...	...	...	5·02	21
...	...	...	×	...	×	×	...	×	...	...	×	...	...	×	...	×	...	...	...	...	...	...	...	...	...	...	...	10·61	22
...	...	...	...	...	×	...	...	...	...	...	...	...	...	×	...	×	...	...	×	...	...	...	...	×	...	×	...	1·67	23
×	×	...	...	...	×	×	...	×	...	...	...	...	...	...	...	×	...	×	...	×	×	×	×	...	...	...	...	5·58	24
...	...	...	...	...	...	...	×	...	×	...	...	...	...	...	...	×	×	...	...	...	...	...	...	×	×	...	...	7·82	25
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...	×	...	×	..	×	...	...	...	...	×	×	×	...	×	×	×	...	×	...	...	×	×	×	×	×	...	...	24·02	27
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...	...	...	...	×	...	...	×	×	...	...	×	...	...	×	...	×	×	×	..	...	...	...	...	×	×	...	...	9·49	30
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...	×	×	...	...	×	×	...	×	×	×	×	...	×	...	×	×	...	...	×	×	...	...	×	×	×	×	×	39·1	35
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...	...	...	×	...	×	×	...	...	×	...	×	...	...	...	×	×	...	...	...	...	×	×	×	×	×	...	...	2·23	39
...	...	×	...	...	×	...	...	...	×	...	×	...	×	×	...	×	...	...	...	...	...	...	...	×	×	...	...	4·46	40
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...	...	...	×	...	×	×	...	...	...	×	×	×	...	...	×	×	...	×	...	×	...	×	×	×	...	...	...	5·58	42
...	...	...	×	...	×	×	...	...	...	...	...	...	...	...	×	×	...	×	...	×	×	...	×	×	...	...	...	1·11	43
...	...	×	×	...	×	×	...	...	...	×	×	...	×	×	×	×	...	×	×	×	×	×	...	×	×	×	×	8·93	44
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...	...	...	...	...	×	...	...	...	...	...	×	...	×	×	...	×	...	...	...	...	...	...	×	×	×	...	×	3·91	47
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Notes on Fungi observed within the Clyde Area.

By D. A. Boyd.

[Read 25th June, 1912.]

In the following notes, reference is made to various species which have recently been added to the list for the Clyde Area, so far as these have come under my own observation. Additional localities are also recorded for certain rare or little-known forms. Species not previously reported for "Clyde" are denoted by an asterisk prefixed to the generic name.

Thanks are due to the Hon. Secretary of the Andersonian Naturalists' Society for permission to include various records obtained at excursions of that Society. These are denoted by the sign "†" prefixed to the names of the respective localities where the Fungi were gathered.

**Pistillaria micans*, Fr.—On dead stems of *Senecio sarracenicus;* banks of River Garnock above Kilwinning. Identification confirmed by Mr. A. D. Cotton, F.L.S.

Plasmopara pygmæa (Ung.) Schröt.—On *Anemone nemorosa;* Neilston.

Peronospora candida, Fckl.—On *Primula vulgaris;* Brodick.

Puccinia chrysosplenii, Grev.—On *Chrysosplenium oppositifolium;* east side of Loch Long.

* *Taphridium umbelliferarum* (Rostr.) Lagerh. and Juel.—On living *Heracleum Sphondylium;* near Stevenston, Irvine, and Dreghorn (Ayrshire); Rosneath (Dumbartonshire).

Meliola Niessleana, Wint.—On living *Vaccinium Vitis-Idæa;* Glen Falloch.

Coccophacidium pini (A. & S.) Rehm.—On dead bark of *Pinus sylvestris;* † Dougalston.

Orbilia marina (Phil.) Boyd.—On decaying fronds of *Fucus;* Rosneath.

Coryne atrovirens (Pers.) Sacc.—On a dead twig in a wet place; Glen Falloch.

Mollisia digitalina, Phil.—On a dead stem of *Digitalis purpurea* east side of Loch Long.

Dasyscypha crucifera (Phil.) Sacc.—On dead branches of *Myrica Gale;* near Whistlefield (Dumbartonshire).

Vibrissea truncorum (A. & S.) Fr.—On dead twigs and branches in wet places; Cnocan Burn, Goatfell.

* *Diaporthe* (*Chorostate*) *strumella* (Fr.) Fckl.—On dead branches of *Ribes Grossularia;* West Kilbride.

* *D.* (*C.*) *salicella* (Fr.) Sacc.—On dead branches of *Salix fragilis;* West Kilbride (Ayrshire); † Campsie Glen (Stirlingshire).

* *D.* (*Tetrastaga*) *Wibbei*, Ntke.—On dead branches of *Myrica Gale;* Glen Lean (Argyllshire); Whistlefield.

* *Phyllosticta mahoniana*, Sacc.—On *Mahonia aquifolia;* † Lanfine (Ayrshire).

Ph. ajugæ, Sacc. & Speg.—On *Ajuga reptans;* east side of Loch Long.

* *Rabenhorstia tiliæ*, Fr.—On dead branches of *Tilia;* West Kilbride; † Campsie Glen; Rosneath.

Coniothyrium Boydeanum, A.L.Sm.—On dead twigs of *Fuchsia;* Rosneath.

Septoria lepidii, Desm.—On *Lepidium Smithii;* Rosneath.

* *Leptostromella juncina* (Fr.) Sacc.—On dead culms of *Juncus communis;* Beith (Ayrshire).

Coryneum disciforme, Kunze & Schm.—On dead bark of *Betula;* Rosneath.

* *Pestalozzia Guepini*, Desm.—On a leaf of *Camellia;* Rosneath.

Ovularia bistortæ (Fckl.) Sacc.—On *Polygonum Bistorta;* Rosneath.

* *Ramularia aromatica* (Sacc.) Von Höhnel.—On fading leaves of *Acorus Calamus;* Perceton (Ayrshire).

* *R. geranii*, Fckl.—On *Geranium sanguineum;* Portincross (Ayrshire).

* *R. heraclei* (Oud.) Sacc.—On *Heracleum Sphondylium;* West Kilbride; Rosneath.

* *R. knautiæ* (Massal.) Bub.—On *Scabiosa succisa;* West Kilbride. This was previously recorded as *R. succisæ*, Sacc.; ‡ but specimens submitted to Miss. A. Lorrain Smith, F.L.S., have been referred by her to *R. knautiæ* rather than that species. First described by Massalongo as

‡ *Glasgow Naturalist*, Vol. IV., p. 16.

a variety of *R. succisæ*, *R. knautiæ* "differs from that species in the much darker leaf spots and the smaller spores."§

R. montana, Speg.—On *Epilobium montanum;* Rosneath. This name has priority to *R. epilobii* (Schn.) Trail, for which various records for the Clyde Area have already been reported.

* *R. scrophulariæ* Fautr. & Roum.—On *Scrophularia nodosa;* † Dundonald (Ayrshire).

I have to express my grateful thanks to Miss A. Lorrain Smith, F.L.S., for kind assistance in the identification of many of the species mentioned in the foregoing notes, and to all who have otherwise aided me in any way.

Excursions.

Milton-Lockhart, 10th June, 1911.—Mr. John Renwick supplies some particulars of remarkable trees measured at this excursion. A Lime Tree (*Tilia platyphyllos*) to west of house, girth 12 feet 9 inches at 3 feet 5 inches; bole, 12 feet; and three Elms, which Dr. A. Henry, F.L.S., states agree well in leaf with "English Elm" (*Ulmus sativa*, Miller)—

one on Millhill, girth, 15 feet $1\frac{1}{4}$ inches at 5 feet 4 inches; bole, 20 feet;

one nearest house, girth, 10 feet $1\frac{3}{4}$ inches at 5 feet; bole, 25 feet;

one at opposite end of row, girth, 11 feet 3 inches at 5 feet 4 inches; bole, 35 feet.

Regarding the first of these, it was stated in the report of our visit to Milton-Lockhart in 1902, "the largest English Elm we know of in Clyde Area" (*Trans. Nat. Hist. Soc. of Glasgow* (N.S.), VI., p. 348). Dr. Henry writes of it, "as 15 feet $1\frac{1}{4}$ inches is a good size for an English Elm to be in N.B., height of this tree and small photo. would be interesting. I can't understand shortness of bole except on theory that the tree is dwarfed in height by your northern climate. It is a typically southern tree."

§ *Transactions of the British Mycological Society*, Vol. III., p. 370.

ALLANTON HOUSE AND GROUNDS, 24th June, 1911.—Mr. John Renwick, Conductor. Allanton is situated in the valley of the North Calder, fully a mile from Newmains and between three and four from Wishaw. It belongs to Sir Alan Seton Steuart, Bart., and the house is tenanted by Mrs. Wilson, both of whom kindly granted permission for our visit, and the latter invited us to tea. The overseer, Mr. A. Green, was our guide. The estate is interesting on account of the once famous experiments in tree transplantation carried on by a former proprietor, Sir Henry Steuart, between 1819 and 1824. He wrote a description of his experiments in *The Planter's Guide*, published in 1828, which was reviewed by Sir Walter Scott in *The Quarterly Review* same year.

Allanton was visited by a committee of gentlemen (which included Sir Walter Scott) deputed by the Scottish Highland Society to investigate the transplantations for which Allanton had become famous. This was in 1823. The committee seem to have been pleased with their visit, and were satisfied (1) with the singularly beautiful shape and symmetry of the trees, (2) with their health and vigour, and (3) with their upright and even position.

Sir Walter Scott visited Allanton again in 1829. On one of his visits he planted two trees. Mr. Green pointed out as one of these a Lime (*Tilia vulgaris*), the common planted Lime, a hybrid between *T. parvifolia* and *T. platyphyllos*. The remains of the machine used in the transplantation experiments were seen. The machine had consisted of a long pole and frame mounted on two large wheels. It was backed up against the tree, which had been loosened at the roots and prepared for removal. It was then turned up vertically, fastened to the tree, and pulled down to the horizontal and dragged to the destined place.

The weather was very unpropitious during this excursion. Among plants noted were the Adder's Tongue (*Ophioglossum vulgatum*), *Briza media*, *Listera ovata*, and *Epipactis latifolia*, the last named abundant.

CARSTAIRS HOUSE, 8th July, 1911.—Mr. James Whitton, Conductor. On arrival at Carstairs junction, the party were met by Mr. Milne, estate overseer, who acted as cicerone in the most

pleasant manner. The carriageway was followed through a mixed plantation, chiefly Oaks and Acers, the Norway Maple being very vigorous, with several healthy examples of the Douglas Fir. After passing the above-named plantation attention was drawn to the effects of the sharp frost which occurred on 14th June. Young growths on Rhododendrons, Spruces, &c., were scorched as if by fire. From this point some years ago the present proprietor had diverted the carriage drive and brought into view much of the fine old timber which adorns the policies, which before was hidden amongst useless undergrowth. Amongst the many Birches (*Betula verrucosa*), the following were measured:—No. 1, on left-hand side of carriageway—girth, 5 feet 1½ inches at 5 feet (5 feet 5 inches at 3 feet), height, 70 feet, bole, 27 feet; No. 2, on right-hand side of carriageway—girth, 5 feet 5½ inches at 5 feet, height, 75 feet, bole, 30 feet. A large Rowan (*Pyrus aucuparia*) girthed 5 feet 9 inches at 3 feet, the bole being but 4½ feet. A red Maple (*Acer pictum* var. *colchicum-rubrum*) girthed 4 feet 0½ inch at 5 feet, the bole 6 feet. After passing the group of hardwoods some splendid Scots Pines were seen. The best measured were—No. 1—7 feet 7½ inches at 5 feet, with a bole 40 feet; No. 2—7 feet 5½ inches at 5 feet; and No. 3—8 feet, 7 inches at 3 feet 6 inches; all these were on the right-hand side of the carriageway. A few yards past the big pines a mixed group of *Piceas* (*Abies*) was examined, and some interest created by finding, side by side, examples of the White and Black American Spruces. The white bore a few of its graceful pendulous cones, but none of the black species was in cone. Passing onwards by the lower end of the lake, a small colony of the twayblade (*Listera ovata*) was seen. In the glade near the crosspaths a large specimen of the Common or Norway Spruce (*Picea* (*abies*) *excelsa*) was noted. The height would probably be 70 feet, and at 4 feet it girthed 8 feet 5 inches. As a lawn tree it is a noble specimen, it being clothed to the ground with healthy branches. It was, however, an excellent object-lesson to the forester in the treatment of that species for the production of economic timber, as it was simply useless for commercial purposes. Turning southwards, the party passed along an avenue of Lime trees, planted probably sixty or seventy years ago, whose branches have

crossed and intermingled, producing a pretty effect and a pleasant shady path.

On a large grassy area, which links the wild woodlands to the highly-kept lawns around the mansion, a number of the newer conifers have been planted, many of them having attained to a considerable size. These have been planted purely for effect, and do not really indicate their economic value as timber trees. They were, however, of much interest, and several of the largest were measured. These were:—*Pseudotsuga* (*Abies*) *Douglasii*, 9 feet 3 inches at 5 feet, and another, 8 feet 6½ inches at 5 feet; *Tsuga* (*Abies*) *canadensis* (The Hemlock Spruce) girthed 7 feet 0½ inch at 1 foot 10 inches, the bole being only 2 feet. The tree was a good example of the form which this species takes as grown in this country, where it is more in vogue as a lawn specimen than a timber-producing tree. A fine specimen of *Picea* (*Abies*) *orientalis* girthed 4 feet at 5 feet. A number of nice trees of *Abies* (*Picea*) *nobilis* added a note of shade in the general grouping. On the banks of the mound a number of species were seen, amongst which were several examples of *Abies albertiana*. Near the end of the glade an object lesson of great interest was seen, through two trees, which have created no small confusion in nomenclature, being discovered growing in juxtaposition, enabling their respective characters to be conveniently compared, these trees being good specimens of their kind, viz.:—*Thuja plicata* = T. *Lobbi* = T. *gigantea*, 5 feet 10½ inches at 3 feet 6 inches, and *Libocedrus decurrens*, girth, 3 feet 3 inches at 5 feet. The trees are so dissimilar that no one who has once seen such developed specimens as these need ever again be at a loss in recognising each species.

The party, on arriving at the mansion, were kindly received by the venerable proprietor, Sir James King, Bart., who hospitably entertained the members to tea, and, after showing objects of interest in the public rooms, accompanied the party through the gardens to the park, with its avenue of Beeches extending from the Roman Camp to the Mausoleum of the Fullartons. The avenue is a mile in length. The genial baronet gave an interesting account of the history of the estate and its principal features, afterwards bidding good-bye at the garden gate, and hoping to have the pleasure of seeing the party back at some future time.

Proceedings of the Society.

The fourth meeting of Session 1911-1912 took place on 19th December, 1911, in the Natural History Class-Room, Glasgow University, Mr. John R. Lee, President, in the chair.

Messrs. James M. Fullarton, 20 Dundrennan Road, Langside; J. F. M. Floyd, B.A., Natural History Department, Glasgow University; and J. S. Dunkerly, B.Sc., 7 Alford Terrace, Hillhead, were elected ordinary members of the Society.

Professor J. Graham Kerr, M.A., F.R.S., &c., read a paper on "Loch Sween," and exhibited specimens to illustrate the plankton of that loch (pages 33-48).

The fifth meeting of Session 1911-1912 took place in the Society's Rooms on 30th January, 1912, Mr. John R. Lee, President, in the chair.

Before proceeding with the business Mr. D. A. Boyd referred to the loss the Society had sustained through the death of

COLONEL R. E. S. HARINGTON STUART,

of Torrance, East Kilbride, who had been a member since 1889. Although, of late years, owing to failing health unable to attend the Society's meetings, his interest in its welfare was maintained in many ways. Mycology was the study that specially attracted him. On several occasions our members were privileged to visit Torrance under his guidance. It was resolved to send to Mrs. Harington Stuart an expression of the sympathy of the Society in her bereavement.

Mr. John Guy, M.D., The Sanatorium, Bridge-of-Weir, was elected an ordinary member.

Dr. Stirton exhibited *Leucobryum pumilum* (Michaux), which he had found on the Torridon sandstones, Gairloch. This is the first British record for this moss, which is well known from North America.

Mr. Frank M'Culloch sent for exhibition a Great Skua (*Megalestris catarrhactes*), obtained at Inveraray in December. This is the first occasion on which the species has been obtained in the Clyde area, although it has been seen a very few times off the Carrick coast (Ayr). Mr. M'Culloch also sent a specimen of the Little Auk (*Mergulus alle*), recently obtained near Motherwell.

Mr. W. R. Baxter exhibited some autochrome lantern slides of flowering plants, &c.

Mr. Peter Ewing, F.L.S., read a paper entitled "The Summit Flora of the Breadalbane Range" (pp. 48-62). Mr. Ewing also submitted his report on the meeting of the British Association at Portsmouth, where he had represented the Society.

The sixth meeting of Session 1911-1912 was held in the the Society Rooms on 27th February, 1912—Mr. John R. Lee, President, in the Chair.

Before the business commenced, Professor L. A. L. King, M.A., referred to the great loss the Society had sustained through the death of

DR. THOMAS BEATH HENDERSON.

In the branch of Natural History which, so far as our Society is concerned, he had made peculiarly his own, Dr. Henderson was a constant and much appreciated contributor to our meetings. He brought forward many interesting exhibits of snakes and lizards and their kin, and by his bright, pithy remarks thereon, revealed some of the romance and glamour that he found in his pursuit of the study of reptile life. He presented many valuable specimens of reptiles to the British Museum, to the Hunterian Museum, Glasgow University, and to Kelvingrove Museum, as well as various teaching institutions and private collectors. Apart from this speciality, Dr. Henderson, who had been a vice-president of the Society, was a man of wide culture and many interests, and a delightful personality. It was resolved to send a message of condolence to the bereaved relatives.

Mr. James George Walker, M.A., Nether Auchendrane, Ayr, was elected a life member.

Mr. D. A. Boyd exhibited *Hypomyces aurantius* (Pers.) Fckl., a fungus parasitic on *Polystictus versicolor* (L.) Fr. Mr. Boyd also showed bulbs of Wood-Hyacinth, to illustrate the penetrative force of growing rhizomes of *Agropyron repens*.

Mr. P. Ewing, F.L.S., exhibited some South of England flowering-plants, and the following from Scottish localities:—*Draba rupestris* Br. *f. laxa* Lindl., from near the summit of Ben Lawers, a new record, *Epilobium nummulariifolium*

from Ardrishaig, *Menyanthes trifoliata* L., from an altitude of 3,000 feet on Creag Mohr, *Juncus tenuis* Willd., from Hell's Glen (Argyll), found on both sides of the road for six miles; *Carex flava* × *Œderi* (Brug.) from St. Catherine's (Argyll), *Carex flava* × *Hornschuchiana* Hoppe, also from St. Catherine's. These are new records for these two hybrids. Mr. Ewing also showed *Nitella opaca* Ag. from a small pool at an altitude of 3000 feet on Creag Mohr.

Mr. Hugh Boyd Watt sent some catkin-bearing twigs of several kinds of Poplar, and Mr. Wm. Pettigrew showed some lantern slides, including some autochromes.

Mr. D. A. Boyd read some "Mycological Notes" (pp. 85-88).

The seventh meeting of Session 1911-1912 took place in the Society's Rooms, on 26th March, 1912, Mr. John R. Lee, President, in the chair.

Mr. Jas. J. F. X. King, F.E.S., exhibited *Hylecœtus dermestoides*, L., from Lochlong side—a species of a family of coleoptera new to "Clyde"; also *Clinocara undulata* Kr. from Braidwood (Lanark).

Mr. Laurence Watt exhibited some flowering plants (pp. 81-85). Mr. Watt also showed *Sirex gigas*, L., found at Clydebank, which had come out of wood brought from Austria.

Mr. George Herriot showed lantern slides of plants, including a number of autochromes.

Mr. Richard Elmhirst, F.L.S., read a paper on "Some Echinorhynchs from the Clyde Area" (pp. 88-90).

Mr. Wm. J. M'Leod gave some "Further Notes on the Aquatic Coleoptera of the Monklands" (pp. 115-123), and Mr. Anderson Fergusson submitted a paper entitled "Additions to the Lists of Clyde Coleoptera" (pp. 70-81).

Mr. James Whitton's paper entitled "Meteorological Notes and Remarks upon the Weather during 1911, with its General Effects upon Vegation," was held as read. Comparing the rainfall for the year with the average for the previous twelve years which was 38·42 inches, it was found to be rather less, amounting to 36·50 inches. February was the wettest month with 5·74 inches, November having 5·51 inches and December 5·04 inches. March was the dryest month having 1·49 inches, August

following with 1·66 inches and September with 1·82 inches. Atmospheric pressure was fairly high throughout the year, and the range a little over 2 inches. The highest reading of the barometer during the year was 30·60 inches on 1st February, and the lowest 28·50 on 5th November, when a most destructive gale raged throughout Scotland. The easterly group of winds prevailed on 127 days and the westerly group on 224 days. In regard to temperature the most notable feature of the year was the comparative freedom from severe frosts. No frost was registered in March, May, June, July, August, September, and December. It is but rarely that we escape frost in March and December in this district. There was more sunshine, and the general temperature was higher during the year than usual. The display of blossom on all trees and shrubs was above the average, and the Rhododendrons were, if anything, finer than in 1908, when they were thought to be specially good.

The eighth meeting of Session 1911-1912 took place on 30th April, 1912, in the Society's Rooms, Mr. John R. Lee, President, in the chair.

Mr. A. Shanks reported on an excursion to Swinlees Glen, Dalry.

Mr. Jas. J. F. X. King, F.E.S., exhibited the following coleoptera :— *Proteinus ovalis*, Steph., P. *brachypterus*, F., *Megarthrus affinis*, Müll., from Bonhill, and M. *sinuaticollis*, Lac., from St. Germain's Loch. *Proteinus brachypterus*, F., and *Megarthrus sinuaticollis*, Lac. are new to "Clyde" and M. *affinis*, Müll., new to Scotland.

Mr. J. G. Robertson exhibited two interesting mosses :—*Pottia intermedia*, Fürnr, from Giffnock, and *Eurynchium pumilum*, Schp., from Campsie Glen.

Mr. W. R. Baxter gave a lantern exhibit of fungi, &c., by the autochrome process.

Mr. John Paterson read a preliminary report on the appearance of summer-birds in "Clyde," in 1912 (pp. 66-70).

The ninth meeting of Session 1911-1912 took place in the Society's Rooms, on 28th May, 1912, Mr. John R. Lee, President, in the chair.

Reports on excursion to Lugton (by Mr. D. A. Boyd), Dalserf (by Mr. W. M. Pettigrew), and the Fairies' Loch, Tarbet (by Mr. J. R. Lee) were submitted.

The President (Mr. Lee) exhibited (*Thuidium delicatulum*), Mitt., from the Falls of Falloch, where it was found fruiting, a rare occurrence with this species. *T. tamariscinum*, B. & S., and *T. recognitum*, Lindb., were shown for comparison.

Mr. H. D. Shields showed some abnormal birds' eggs.

From the Killin district, Mr. J. G. Robertson exhibited the following rare mosses:—*Myurella julacea*, B. & S.; *M. julacea* var. *scabrifolia*; and *M. apiculata*, B. & S.

Mr. N. G. Reid exhibited some lantern slides illustrating bird life on Ailsa Craig.

Mr. Peter Ewing, F.L.S., read a paper on "The Flora of the Culbin Sands."

Mr. Andrew Barclay, F.E.I.S., contributed "Some Notes and Observations on *Bipalium kewense*."

The tenth meeting of Session 1911-1912 took place on 25th June, 1912—Mr. John R. Lee, president, in the chair.

Before the formal business of the evening, the President made appropriate reference to the loss the Society had sustained in the death of Colonel Mure of Caldwell.

Mr. D. Macdonald, 191 Albert Terrace, Renfrew Street, Garnethill, was elected as an ordinary member.

Reports on excursions to Rosneath and Glen Douglas were communicated by Messrs. John Paterson and the President (Mr. Lee).

Mr. J. G. Robertson exhibited *Dicranum schisti*, Lindb., from Glenfalloch, a moss new to the Clyde area. It is usually got at high altitudes, but in this case, at an elevation of but 300 feet above sea level.

Mr. Jas. J. F. X. King, F.E.S., exhibited the following:—*Spilographa hamifera* Lev., a rare fly from Rosneath; *Apion miniatum*, Germ., a beetle new to "Clyde"; A. *hæmatodes*, Kirby, from Gailes (Ayr).

Mr. Charles Kirk sent for exhibition an unique example of hybridism between the Eider-duck (*Somateria mollissima*) and the Mallard (*Anas boscas*) from Auskerry. This remarkable hybrid

has since been figured in the "Scottish Naturalist" (Plate v., 1912).

Mr. D. A. Boyd read some "Notes on Fungi observed in the Clyde Area" (pp. 124-126).

Mr. John Renwick read "Notes on the Yew Trees of the Clyde Area," which will appear in these pages.

Notes.

Wild Cats at Kilmartin.—My assistant here comes from Kilmartin, and about 1886, his father, who was keeper to Malcolm of Poltalloch, captured a wild cat in a trap by the toe. When approached by another keeper it sprang at him. He called on my assistant's father, Mr. Blackie, and, when he got near, the cat sprang at both, trap and all! Mr. Blackie shot it and got it stuffed, and a son of his has it still. Some years previous two were shot by Mr. Blackie but were thrown away.—Laurence Watt, 35 Taylor Street, Clydebank, 26th February, 1912.

Glaucous Gull (*Larus glaucus*) **in Clyde estuary.**—On March, 27th, 1912, I saw a Glaucous Gull at the south end of Arran, and on 24th April I shot one which I am sending to our Ayrshire Museum [Kilmarnock ?]. Another was shot, about the New-Year, six miles from here.—J. M'Crindle, Dunure, Ayrshire, 26th April, 1912

Grey Plover (*Squatarola helvetica*) **in unusual numbers at Fairlie, Ayrshire.**—The Grey Plover is an annual late autumn visitor to the Fairlie sands, generally appearing in October, but occasionally as early as September 6th. Usually only one or two are seen in a day, although, on several occasions, I have come across a party of five or six. On September 30th, 1912, the third day of a hard blow from the north-east, I lay for some three hours on the Green Point at Hunterston, at high water, watching Grey Plovers passing along the shore. They flew in twos and threes, sometimes in company with Dunlins and Redshanks, but generally by themselves. As they rounded the point, and caught the full

force of the wind, they displayed two characteristic features of their plumage, *i.e.*, the white rump and black axillaries alternately. At a moderate estimate, fifty to sixty birds must have passed during the period stated, all, with the exception of two birds which went inland, going due north. Golden Plover (*Charadrius pluvialis*) were numerous, flighting between the fields and the muds, but not consorting with the Grey Plovers.—R. W. Wilson, Glasgow.

Grey Squirrel on Loch Longside and Loch Lomondside.—The appearance in our district of the grey squirrel, which has become familiar in some English districts, including the London Parks, is a matter of great interest to naturalists. When walking up Loch Long on 30th September, 1912, one crossed the road in front of me, at a point about two miles below Arrochar. Mr. John Renwick saw one at Stuckgown in the summer of 1912, and it appears from information which Mr. Renwick has since collected, that it was the belief of the late Sir Alan Colquhoun, that the origin of the grey squirrels now to be seen on Loch Lomond and Loch Long was a pair liberated at Finart, Loch Long, about twenty years since. They seem to have spread from Finart up to Arrochar and Tarbet, and have gone down Loch Lomond from that point for ten miles to Luss, where they were first seen last year. Mr. Renwick says, what can be well believed, that it seems to be ousting the smaller native species. It is said to be very destructive to the upper shoots of the Scots Fir.—John Paterson.

Bean Goose *(Anser segetum)* **in East Renfrewshire.**—On 13th October, 1912, Messrs. Robert and Hugh Wilson and I saw thirteen Grey Geese pass over Balgray Dam from east to west. While the specific identification of Grey Geese on the wing is a matter of difficulty, I am satisfied that these were Bean Geese. Among other points which led me to this conclusion were their size, slender form, length of wing, and easy flight, and their few harsh notes, somewhat lazily uttered.—John Robertson, 529 Clarkston Road, Cathcart.

Abnormality in a Kitten.—When at Aikenhead Gardens, Cathcart, this morning (18/9/12), I saw a black Kitten with

seven well-developed claws on each foot. The animal looked double footed, as the secondary foot had three claws well formed. —Jas. Whitton, Superintendent of Parks, Glasgow.

Recurrence of the Black-tailed Godwit *(Limosa belgica)* **in Ayrshire.**—On 12th September, 1912, I observed three Black-tailed Godwits feeding in company with five Bar-tailed Godwits *(Limosa lapponica)* within a stonethrow of the railway embankment in Troon Harbour. They appeared more timid than the latter species, and on being disturbed by a passing railwayman flew right away, and did not again come under observation. As they lifted from the mud, the black tail, with its narrow edging of white, was distinctly seen. This is the second recorded occurrence of *L. belgica* for Ayrshire, Mr. Galloway having observed two birds at Troon on 17th September, 1911 (*Glasgow Naturalist*, IV., page 20).—Hugh W. Wilson, 437 Clarkston Road, Cathcart.

Curlew-Sandpiper (*Tringa subarquata*) **and Greenshank** (*Totanus canescens*) **in East Renfrewshire.**—In great contrast to the autumn of 1911, the condition of East Renfrewshire reservoirs this year was not attractive to waders till too late in the season, and consequently the only noteworthy birds observed were the Curlew-Sandpiper and the Greenshank. Of the former, I saw three birds on 29th September, six or seven on 6th, and one on 13th October—all at Balgray. On the last date there were probably more than one, but poor light and bad weather interfered with identification. While I was watching those of 6th October, four of them left the dam and, with two Redshanks, rose high in the air and flew away west, evidently bound for the Ayrshire coast. Greenshanks were observed by Messrs. Robert and Hugh Wilson or myself, on eight out of nine visits to Waulkmill Glen and Balgray Dams, between July 21st and October 13th. The numbers seen were respectively four, three, two, four, and one at Waulkmill Glen, which was then deserted for Balgray, the latter having become more suitable, and the numbers observed there were one, one, and two.—John Robertson.

Philonthus thermarum, Aub., at Rowardennan, a correction.—In a list of Coleoptera taken at Rowardennan in

September, 1911, kindly given to me by Mr. W. E. Sharp, *Philonthus thermarum* was noted, and I accordingly included the species in the Second Paper of Additions to the List of Clyde Coleoptera (*The Glasgow Naturalist*, vol. IV., p. 75). After the paper was in print, Mr. Sharp, on a re-examination of the specimen, came to the conclusion that it was really a very small and immature example of *Gabrius appendiculatus*, Shp., not quite normal as to thoracic punctuation. The record of *P. thermarum* should accordingly be deleted. *G. appendiculatus* has not been recorded from the Clyde area.—A. Fergusson.

Birds of Beith, a Correction.—In the paper on the "Birds of the Parish of Beith and Neighbourhood" the names of the following birds should have been preceded by an asterisk:—Willow-Wren (p. 100), Blue Titmouse (p. 102), Lesser Redpoll (p. 105), Starling (p. 107), Carrion-Crow (p. 108), Sky-Lark (p. 108), Kingfisher (p. 109), Cuckoo (p. 109), Barn-Owl (p. 109), Long-eared Owl (p. 110), Common Sandpiper (p. 113), Little Grebe (p. 114).

INDEX.